The Commercial Car Journal

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Bright Outlook Predicted for Export Business at N. A. C. C. Export Conference

NEW YORK, March 7.—A special conference for the purpose of discussing the export situation, brought out even a larger attendance than the regular meetings of the National Automobile Chamber of Commerce, showing the interest in this important subject to American manufacturers at this time. The all-day session included, in addition to the address of Chairman J. Walter Drake, of the N. A. C. C. Export Committee, papers by such men as Roy S. McElwee, assistant chief of the Bureau of Foreign and Domestic Commerce, Washington; Allen Walker, manager, Foreign Department of the Guaranty Trust Co., of New York; Ira A. Campbell, Admiralty Counsel, United States Shipping Board, Washington; George Ed. Smith, president, American Manufacturers' Export Association, New York; James L. Steuart, of Steuart & Perry, New York; J. H. Teagan, Hupp Motor Car Corp., Detroit; P. S. Steenstrup, general manager, General Motors Export Co., New York; D. B. Richardson, foreign sales manager, Studebaker Corp.; Louis Domeratzky, Division of Foreign Tariffs, Washington; Al Reeves; Attorney Montague, who drew up the Webb-Pomerene Law, which provides for a combination of competitors for export selling, and several who had recently returned from Europe. The delegates enjoyed an unusually well-prepared buffet luncheon between the morning and afternoon sessions.

Chairman Drake, in his opening remarks, called attention to the fact that business in foreign countries seems to fall in the wake of the Christian missionaries, and it would almost pay the business world to provide for the missionaries from a purely business standpoint. He made a plea for high ideals in our foreign trade, and said that the American automobile industry would undoubtedly be a leader in American foreign trade. As an illustration of the care that must be exercised in form, color, etc., of goods going into Oriental countries, he cited the case of a lamp sold by the Standard Oil Co. in large quantities in China, the pattern of which was slightly changed, resulting in a complete loss of the business. Also a sewing machine company, which after enjoying a large sale, changed the number of spokes in the belt wheel; again the Chinese business was lost until they changed back to the original pattern. He warned that there would be competition in Europe, but that the business was ours in the future if we went after it, but that we must be willing to play the waiting game. He further emphasized the importance of service, saying that it was more important in the export business than at home.

No Tax on Cars for Export

General Manager Reeves said a few words on the new Revenue Bill, calling attention to the Export Committee of the Chamber, which is compiling statistics as a publicity division, in studying such problems as the straight side tire, etc. He said that C. C. Hanch, chief, Automotive Products Section, was at the present time attending an international conference in Europe of automobile and truck men, and gathering information. Reeves stated that the N. A. C. C. had assurance that there would be no tax on cars exported directly from the factory or through an export house or agent.

No "Orphan Annies"

Mr. McElwee emphasized the importance of service. His talk hinged around the thought that automobile and truck manufacturers of the United States could not afford to allow any concern whatever to send to a foreign country cars unsupported by proper service, and not followed up by local resident representatives. He called them "little orphan Annies," and very forcibly illustrated the fact that one or two such cars will ruin the business for American makers in large sections of the country. Makers must see that every car of American make introduced is kept running, even if it is a competitor's machine.

United States Against All Others

"It is not a case," he said, "of competition between American makers, but between American-made cars and all of the rest of the world."

He suggested that large makers could do very well at first by having a service manager living in the center of the territory in which he is selling, with a telephone number and stenographer, or some one to answer the 'phone at all times while he is on the road. A mechanic is necessary, and a stock of parts. In other words, a miniature complete branch office consisting of, say, from three to five people.

Smaller exporters can make a combination of four or five, and together maintain such an office, telephone, traveling representative and service man. Accessories can also be handled by such a central office.

How Government Will Help

He cordially invited the manufacturers to make use of the Bureau of Foreign and Domestic Commerce, stating that they had trade lists and an intelligence division headed by Mr. Domeratzky, who would be very glad indeed to answer communications or forward them to the proper departments at Washington; that they also had 44 commissioners or attachés traveling around the world, men who spoke the languages of the countries in which they operated.

Mr. Domeratzky then spoke of the tariff situation, particularly the restrictions, which he said were more or less temporary, and would gradually be reduced, he believed. He spoke of the tariff reform element in England as taking advantage of the present situation to increase the tariff, but that the British commercial element were just as strong for taking off the tariff. The result of these conflicting elements could not be predicted. He also mentioned that on account of the tremendous balance of trade against foreign countries and in favor of United States, they are unwilling to import any more than they absolutely have to. The present tariff restriction will be found in connection with this article.

Combinations Under Webb-Pomerene Law

Allen Walker and Lawyer Montague told how it was possible for any group of manufacturers to get together and

form an association for the purpose of export trade, that such association could fix foreign prices, agree upon territory, terms of credit, etc., and do many things which before the war would have caused them to look for bail. The manufacturer's individual connections abroad may even be retained after combining with others under the Webb Act. Although there are difficulties in forming such big combinations, still in the cases handled by these men, it was stated that in every instance matters had been settled satisfactorily to all parties concerned.

South American papers are against the Webb Act, saying "why should we be saddled with big combinations of business when we would not allow it in our own country." In order to offset this feeling, the Guaranty Trust Co., of New York, is running, at its own expense, propaganda by means of South American writers. Mr. Walker warned that in any such combination for export under the Webb Act, the output of the entire group must be greater than any one outside member or group of outside manufacturers of similar lines not in the combine.

He paid tribute to the advancement made through co-operation on the part of the automobile industry by comparing it with the clothing business. The very best suit we can buy today is worse than the best one we could buy ten years ago, while the very worst automobile we can buy today is even better than the best of ten years ago.

Uniform Freight Rate to Seaboard

As an illustration of one of the difficulties which arises in a group of manufacturers combining for export, he pointed out that it was impossible for any individual manufacturer in a group to take advantage of a smaller freight rate to the seaboard because of his geographical location, and said that it was absolutely necessary to have a uniform price on the goods in the foreign market, and to do this the average freight rate paid by the group of manufacturers must be added to the foreign price of the car or truck.

The morning session ended with a paper by R. A. Campbell, giving many statistics on the merchant marine progress, and the members were assured that the merchant marine program, as laid out by the Shipping Board, was going to be put through.

Importance of Trade-Marks

In the afternoon session the importance of trade marks; the importance of packing for export; foreign sales problems; publicity and advertising overseas, and the subject of the straight side tire and right-hand drive were discussed.

President Smith, of the American Manufacturers' Export Association, believes that the Government should operate the new merchant marine at a loss, if necessary, to establish American export trade. He made a plea for cheap freight rates, especially at the beginning, and for branch banking houses abroad, and said that American credit balances should be paid, not in pounds sterling, but in American gold.

Mr. Teagan's paper emphasized the damage to our foreign trade, which results from failure to properly pack shipments. He scored the American manufacturers for their carelessness in this respect. Best packing methods are the cheapest in the long run, as they reduce freight charges and breakage, and goods are protected from the weather and are acceptable to the consignee. He then outlined the methods used by some of the large automobile exporters, and showed that it was not advisable to strip a car too much for the sake of more compact crating.

Co-operative Foreign Advertising Suggested

Peter S. Steenstrup suggested co-operative advertising or propaganda in foreign papers boosting the American product. He said that the crude advertising carried in some of the South American papers would not prove that this was the kind of advertising wanted by the South Americans, and advocated as close an approach as possible to our own methods, which have proven successful in advertising in this country. He said that an overseas advertising campaign should embrace the following mediums: American export journals; overseas trade journals; magazines and newspapers; posters and hangers; advertising literature; service literature; a house organ; sales promotion matter, consisting of suggestions for direct-by-mail campaigns; window display; showroom decoration; and advertising aids, such as advertising novelties; window signs; road signs; cinema slides, etc.

Foreign Import Restrictions Affecting Motor Vehicles

The Bureau of Foreign and Domestic Commerce supplies the following information in regard to import restrictions in effect in foreign countries:

Belgium, British India, the Straits Settlements and Federated Malay States: Import restrictions against motor vehicles have been removed.

United Kingdom: Orders of March 21 and June 27, 1916, prohibiting importation of motor cars and chassis, parts and accessories (except tires), except under special license, are still in effect. When licenses are granted for importation of passenger cars, an import duty of 33 1/3 per cent. is levied, value of tires being excluded. Importation of tires has been prohibited since May 10, 1917. Truck importation is also prohibited, except ambulances, fire apparatus, and where it is shown they are for conveyance of essential goods. Truck parts, except for repairs to trucks already in use in the United Kingdom, are also prohibited.

France: Licenses are granted for importation of automobiles and trucks only in exceptional cases. When granted, a special duty of 70 per cent., ad valorem, is levied on vehicles weighing less than 2500 kilos.

French Colonies: Import prohibitions imposed by the French Government did not extend automatically to French colonies, but the Government of Tunis is understood to have adopted practically identical prohibitions.

Italy: Import licenses are required for all goods. Owing to unfavorable exchange conditions, it is improbable that any modification will be made in the near future.

Scandinavian Countries: Import licenses from the respective governments or government-designated associations are required before export licenses will be granted by the United States.

Netherlands: All goods, including automobiles, must be consigned to the Netherlands Overseas Trust.

Switzerland: Import licenses for motor cars are required. Shipments must be consigned to the S. S. S. (Swiss Society of Surveillance).

Australia: No prohibition is in force against importation of trucks. Passenger car bodies are admitted only when accompanied by two chassis.

British West Indies: Prohibition against importation of motor vehicles is still in effect in Trinidad, the Leeward and Windward Islands, but has just been removed in British Guiana.

Canada: Importation is prohibited of automobiles for passenger use, or susceptible of passenger use, when costing more than $1200 f.o.b. factory. Cars costing less may be imported from the United States, Newfoundland, St. Pierre, Miquelon and the United Kingdom. There is no prohibition against trucks.

Ceylon: There is no prohibition, but the prohibitive duty of 100 per cent. is understood to be still in force.

Russia and Finland: Shipments to these countries are prevented by practical difficulties.

South Africa and Egypt: There are no restrictions against motor vehicle imports, but shipping space may be difficult to secure.

He also said that this advertising should be placed from American agencies, through overseas agencies and overseas sales representatives or dealers. Agencies located in the country where the goods are to be sold, are often preferred, as they are familiar with the business conditions. The *Fourth Estate* publishes yearly a complete list of foreign advertising agencies. Some advertising is also placed through local dealers or distributors on a co-operative basis. Here, again, the dealer is in close touch with the local situation. He said, "It is a man-sized job to satisfactorily rewrite English catalogues into French, Spanish, Portuguese or Dutch, and it must be well done to be effective."

The discussion brought out considerable opposition to a co-operative advertising plan on the grounds that this would only stir up latent opposition against the American product.

Straight Side Tires for Export

Mr. Richardson's paper advocated the sale at this time of straight side tires for Europe, in fact for all foreign countries, as being the type of tire which will give more air volume for a given diameter, and he believes will be the ultimate type used. He said the car makers were making a mistake in sending out anything but straight sides and that their dealers and representatives abroad should be educated to the straight side.

In regard to right-hand drive on export cars, he said that this was a thing that could not be avoided, and that we would have to meet conditions as they were. He said that in certain sections of England right-hand drive was brought about on account of the coaches having to pass on the left, because otherwise the driver who sat on the right was liable to strike pedestrians on the sidewalk with his whip because of the narrow roads. This was the beginning of passing to the left, a custom which is now firmly established in many European countries.

During the discussion, C. J. P. Lucas called attention to the fact that the railroads of this country were now co-operating with exporters, and that they would pick up goods anywhere along the line, liter them at the terminal to the steamship dock, take out consular papers, etc., for the exporters, with no extra charge, except ten cents per hundred pounds from the freight yard to the dock, and that after the middle of March manufacturers can get their bills of lading to any port in the world.

The general sense of the meeting was that especially in passenger cars there would not be such competition from European makers as many had believed, and that as far as the heavy duty American war trucks were concerned, France was very much frightened about them and was very anxious for the United States to ship them home again.

Large Number of Automotive Bills Before Albany Legislature

NEW YORK, March 5.—The legislative mill at Albany has begun its annual grind of automotive bills by hearings on a number of measures. Of particular interest was the hearing yesterday on the Knight-Wheelock bill, which is practically the outcome of the conferences held Feb. 1 and 8 in this city by the State Automobile Associations, the Motor Truck Association of America, and the Police Department and City Magistrates. It was pointed out at these conferences that the magistrates were handicapped in dealing with reckless and fast drivers, in that they did not have the power to revoke licenses and that outside of the city, operators of automobiles are not licensed. The Knight-Wheelock bill was the outcome of these conferences, and provided for the licensing of every operator of an automobile, passenger and truck.

At the hearing yesterday Magistrate W. Bruce Cobb, of the Traffic Court, presented arguments in favor of the bill, which had, after minor modifications, the approval of the majority of the state automobile interests. The bill was opposed by the counsel of the three A's, who objected to the licensing of passenger operators and the examination of applicants for licenses. Another passenger car trade association also fought the bill.

The Motor Truck Association of America, which was represented at the hearings, was in favor of the bill, and one of the officers, in speaking of its provisions, said that the majority of the accidents in New York City were caused by passenger cars, but in the records they are credited to the "automobile." He said that no distinction was made between the truck and the passenger car. This all tended to create prejudice, and naturally tended toward drastic legislation. It is also said, unofficially, that the Motor Vehicle Commissioners of adjoining states have intimated a probability of the withdrawal of reciprocity privileges and relations with New York, as operators without licenses traversing their states have created perplexing problems.

Among other bills that came up for a hearing were no less than five measures having to do with bonding owners of all motor vehicles. These bills ranged from $2000 to $10,000. As was to be expected, the up-state residents, particularly the agricultural sections, made their influence felt, and it is very doubtful if the bill gets any further.

One bill introduced would make it mandatory for every car to carry an illuminated rear license plate. This was, of course, practically killed before it got a start. Several minor bills, providing for a rear vision device, made their appearance at the hearing, but were opposed by certain interests.

Objections to Dithrich Bill Stated by Pennsylvania Automobile Men

PHILADELPHIA, March 5.—A delegation of motor truck owners, manufacturers and distributors, including representatives of the Motor Truck Association, the Automobile Trade Association, the Automobile Accessories Business Association and the Pennsylvania Warehouse and Van Owners' Association, appeared yesterday before the sub-committee of the House Committee on Roads. They explained to the members of the sub-committee their objections to the Dithrich bill regulating truck weights and widths, fixing fees, etc.

E. J. Berlet, president of the Stability Motors Co., eastern representative of Atterbury trucks and Fruehauf trailers, was spokesman.

Fixing of truck lengths at twenty feet was one clause to which objection was made, this length not being as practical and economical as the twenty-eight foot length, particularly in the case of moving vans.

It was suggested, also, that there be no regulation by chassis, body and by 28,000 lb. be fixed for chassis, body and load. Mr. Berlet said that a 28,000-lb. regulation, enforced, was preferable to a 24,000-lb. regulation unenforced.

The delegation objected to the limitation of truck width to ninety inches, and suggested that roads in future would be constructed so as to permit the passing of trucks more than ninety inches wide.

Mr. Dithrich, chairman of the sub-committee, announced that the phraseology of the bill would be changed, so that a driver may, instead of shall, lose his license on the testimony of two witnesses.

Besides Mr. Berlet, the following representatives of the automobile trade were present as delegates:

Thomas Quirk, president Motor Truck Association; J. D. Howley, chairman, legislative committee, Motor Truck Association; A. E. Maltby, president Philadelphia Automobile Trade Association; E. L. Lewis, manager transportation department, Packard Motor Car Co. of Philadelphia; W. H. Metcalf, president Automobile Accessories Business Association; H. B. Harper, Overland-Harper Co.; B. Lusse, president Garage Owners' Association; H. W. Hayden, vice-president Motor Truck Owners' Association; H. S. Shertz, executive secretary, Motor Truck Owners' Association.

Commercial Car, Trailer and Truck Attachment Specifications in This Issue

The Rural Express, a Large and Lucrative Field for Dealers

Dealer Must Know His Territory, Its Products, Markets and Prospective Routes

By C. P. SHATTUCK*

ASK the average commercial car dealer, particularly the new one, and the passenger car dealer who took on a line of trucks during the war, what he considers his greatest obstacle in merchandising commercial cars for Rural Motor Express service, and he will invariably reply, "Can't advise him where to start a line." Many specific cases could be cited where the dealer's inability to point out such opportunities for his prospect has resulted in lost sales. Among the many instances where sales have been lost because of lack of this information is that of Mr. Blank, a dealer in a large city. He was approached by Mr. Smith, who was apparently convinced of the possibilities of the Rural Motor Express. After the conventional discussion of the subject, the prospect finally said, "Mr. Blank, I'm sold on the idea. I believe it has wonderful possibilities. Your truck has been recommended to me. Now advise me where I can start a line and I'll investigate the possibilities. If the plan is feasible I'll come in and put my name to a contract."

For Fifty Years This Company Shipped Its Oysters to New York by Water and Rail
Now the Rural Motor Express comes along, cuts time and expense. The truck is shown being loaded with half a ton of oysters in the shell. They were delivered the same night

Dealer Lacked Initiative

"Why—er—there are lots of places," replied the dealer but in the end he admitted he could not point them out at that time, but if his prospect would call again in a day or so, the information would then be available. The prospect did not call again but he did visit another dealer. Ten days later Mr. Blank noticed a publicity item which contained the information that the Progressive Truck Company, his competitor, had sold four of its 5-ton Progressive trucks to A. B. Smith who was inaugurating a Rural Motor Express line, etc., etc. Three weeks later the publicity man of the Progressive Truck Company put over another story, and with an illustration, the caption of which read: "The Fleet of 19 Progressive Trucks in Service With the Farmer to Consumer Rural Express Company." It is needless to point out that Mr. Blank did not represent the Progressive line.

Why Mr. Blank Failed

Mr. Blank's failure was due to a lack of initiative. He was not sold himself on the Rural Motor Express. In common with other dealers he believed in the movement, and that it would afford an opportunity to exploit trucks in a new field. He did not take into consideration the fundamental principles **that the Rural Motor Express is to supply transportation, by highway, to those agricultural sections not adjacent to or adequately served by common carriers and that it is to encourage a greater food production than heretofore, particularly by the small farmer who has made no attempt to market his produce in the past, because of inadequate transportation facilities.**

The Progressive Truck Company's salesman landed the initial order because he not only was sold on the practicability of the Rural Motor Express, but he had made an intensive study of the requirements of the service, particularly the territory to be served. He had taken advantage of the co-operation of the services of the Highways Transport Committee, the Departments of Agriculture, County Agents, etc., as well as individuals and organizations in touch with and thoroughly acquainted with the producing and distributing conditions in all sections of the state in which he was interested. So when his prospect asked where he could start a line, not one possibility, but several were suggested.

How to Obtain Agricultural Data

Any dealer can readily obtain sufficient data to enable him to advise his prospect as to the opportunities for routes, various kinds of production in the vicinity, the seasons of marketing, methods of shipments, types and location of markets, condition of roads, etc. The writer has proven this by an investigation he made of the possibilities for Rural Motor Express in the State of New Jersey.

It will be recalled by readers of the COMMERCIAL CAR JOURNAL that the Highways Transport Committee of the Council of National Defense, divided the country into regions and appointed a chairman for each region. The names of these as well as their territories were published in the February issue of the COMMERCIAL CAR JOURNAL. The regional chairman for region 3, which includes New Jersey, is C. A. Musselman, who perfected the state organization known as the Highways Transport Committee which appointed A. L. Clark, chief of the Bureau of Markets, State House, Trenton, head of the Rural Express.

Offers Co-operation

"The Bureau of Markets of the New Jersey State Department of Agriculture," said Mr. Clark, **"is prepared to discuss opportunities for Rural Motor Express routes with persons interested, and to point out the needs and requirements for distribution in the different parts of the state. We can refer such parties to farmers, association officials, county agents and many others who know local needs and can give first hand information in detail. We can arrange meetings of prospective operators with farmers and will be very glad to extend ourselves in promoting this work."**

Possibilities for Rural Motor Express

New Jersey affords excellent opportunities for the Rural Motor Express, for, during the last 20 years there has been a marked development of the marketable produce of the state. In 1899 the approximate annual value of fruit and vegetables was $13,000,000, and 10 years later the value rose to $17,500,000. In 1917 it was $30,000,000 and considerably higher last year. This great increase is due largely to the efforts of the State

*This is the first of a series of articles by Mr. Shattuck and the second will appear in an early issue.

College of Agriculture and Experiment Station at New Brunswick, with which the Bureau of Markets is allied.

New Jersey is unusually well situated for the growing of fruits, vegetables and such crops as potatoes. The climate and soil are favorable, and the good country **roads afford opportunity for motor highway transportation between the two great cities of New York and Philadelphia within a radius of 60 miles of the State Capitol and with 20,000,000 population.** No state has, perhaps, better market opportunities.

New Jersey produces more than half of all the peppers raised in the United States and more egg plants are grown there than in any other state with one exception. Jersey truckers receive more from their tomato crops than growers in any other state and Atlantic County is the greatest small fruit section in the world. Between Newark and Paterson is the greatest intensive market garden section in the country.

Analyzing the Production

Practically every one of the 22 counties in New Jersey is productive. One of the big crops is potatoes, the bulk of which are grown in Cumberland and Salem Counties. The shipping season is from about July 15 to August 25. In and around Mt. Holly, Burlington Co., is another large producing potato section, which, being farther north, is about a week later in production, shipping from about July 22 to September 1. Other potato producing sections are Freehold, Farmingdale and Cream Ridge, Monmouth Co., Yardville, Mercer Co., and the adjacent territory. The shipping season begins about August 1 and terminates in October. **There are few, if any, trucks serving this territory.**

This Farmer Figured He Could Double His Load and Reduce the Cost per Ton Mile. The Rural Motor Express Came Along and Gave the Farmer a Practical Demonstration of Its Efficiency.

Big Peach Crop for Transportation

The peach season marketing is between July 15 and September 10, and the producing sections are Cumberland and Salem Counties, in the southern part of the state, with Bridgeton and Vineland as centers. Production is scattered through Gloucester and Camden County. Another large peach producing section is Moorestown and Riverton. About 10 per cent. of the crop, it is estimated, is transported by the railroads. Large quantities are transported by motor truck to Philadelphia, and a few growers ship their crops by truck to the New York markets.

There are three crops of apples, two early and one late The former is grown in and around Glassboro, Gloucester Co., and the other at Red Bank, Monmouth Co. The winter apples come in and around Blairstown, Warren Co. This apple producing area extends to and includes Sussex County. The early apples are ready to be marketed from about July 15 to October 1, and the late from September 1 to November 15. The railroad appears to have a monopoly in these sections but it seems there are opportunities for the motor truck under certain conditions. It is known that **bushels and bushels of apples go to waste in New Jersey with the New York market within reasonable motor trucking distance.** When it is considered that very ordinary apples, early in the winter, cost 10 cents each in New York City, and the farmer says he can not obtain enough for his apples to pay for their transportation, there must be something radically wrong. When we also consider that the apple growers on the Pacific Coast can market in New York at a profit, we are forced to ask, "Is it a question of transportation or marketing?"

J. K. Warden, President of Long Island Rural Motor Express Company, Giving Driver Written Instructions for Pick-ups on Return Trip. The Truck is Loaded With Four Tons of Mixed Freight for Patchogue, L. I.

Mixed Vegetables

Mixed vegetables will be found in three principal localities in New Jersey, one centering at Riverton and Beverly, Burlington Co., another around Swedesboro, Gloucester Co., and the third around Hazelett, Monmouth Co. Redfield, Passaic Co., is still another section. The season begins about May 15 with the marketing of asparagus and ends about the middle of October with crops, such as carrots and turnips. The first three named sections produce outdoor crops. Redfield, about 10 miles out of Newark, produces all the year; farms of from 25 to 50 acres of hotbeds supplying New York City, Newark, Paterson, etc. Sweet potatoes are grown in and around Vineland, Cumberland Co., and Swedesboro, Gloucester Co. They are stored in cellars and marketed in the spring.

Tomato and Pepper Crops

Without going into detail, since an accompanying map indicates the tomato-growing sections, it may be said that

Transferring the Load From the Pick-up Truck to the Five-Ton Car. The Smaller Truck Collects and Distributes in the City

Swedesboro has shipped 40 carloads a day in the height of the season. Huge quantities are canned, there being about 50 canneries in New Jersey with the largest at Camden. While it is true that the railroad is largely used there is opportunity for trucks during the season which runs about six weeks from July 1. The story of the tomato crop of New Jersey last season is too well known for further comment other than to point out that motor trucks could have prevented an enormous waste. Peppers follow tomatoes and have a big market in New York and Philadelphia.

Milk Production is $24,000,000

New Jersey is a milk state. It produced in 1918 about $24,000,000 worth, much of which goes to the cities and towns as market-milk, but a very large percentage of which is marketed in New York City and Philadelphia. Motor trucks are used in several different ways, producers using them to transport from the farm to the city where the milk is distributed direct to the consumer, while distributors use trucks to collect both from individual producers and from central points to which the milk is delivered by the producers themselves. One company, operating in Cumberland Co., obtains its supply from small herds, scattered over a considerable territory, where it is impractical for the farmers to deliver the milk to the central plant in the city or even to the central plants in the country. In territory adjacent to Philadelphia a considerable quantity of milk is hauled into Camden and Philadelphia from sections in Salem Co. in particular. Some of the trucks are operated by independent owners who charge less for this service than the rail rate and in addition take the milk directly from the farm. A return load of express in addition to the empty cans is taken, thereby reducing the charge to be applied to the hauling of the milk. The distance covered by these trucks ranges as high as 37 miles each way and as much as 3600 quarts are carried by a truck.

In speaking of the milk situation in New Jersey with particular reference to the establishment of motor truck lines,

One of the Many Small Towns on Long Island Served by the Rural Motor Express
The majority of these stores depend upon New York to supply them with commodities

The Product of a Small Farmer Waiting for the Rural Motor Express Truck Which Will Deliver the Milk and Bring Back the Empty Cans Without Delay or Loss of the Containers.

County Agent P. B. Bennetch says, "In the northern part of the state as well as in some sections in the southern counties, most of the milk is handled by individual producers to shipping stations located on the railroad. This is done mostly by team. **The transportation of this milk by trucks would result in the saving of much effort and time on the part of the producers. Trucks are used to a very limited extent.**"

Opportunities for Short Hauls

The strawberry crop offers opportunities for short hauls. Seasonal markets are opened by the various railroads where the berries are bought for cash by buyers who ship in carload lots. Farmers haul by team in lots of from one to 100 crates of berries. Cultivation is centered largely around Moorestown, Burlington Co., Blue Anchor, Camden Co., and Cedarville and Fairton, Cumberland Co. The season for ripening is from the latter part of May until the first of July. One could go on at length pointing out the opportunities for the Rural Motor Express in serving the small farmer.

Market a Factor in Service

Mr. Clark holds that a suitable market must be considered as one of the most important factors in the establishment of Rural Motor Express lines. New Jersey is fortunate in this respect, being fairly honey-combed with markets of various kinds. Along the coast, south from Bayonne, the seashore resorts furnish the very best markets for two or three months in mid-summer. In most of the larger cities will be found either wholesale or retail farmers' markets. The latter type were conducted in twenty-one cities last year, sixteen of which are indicated on the accompanying map. The city markets, where all kinds of produce for a long season find a ready sale, afford the greatest opportunities.

Laying Out Tentative Routes

In suggesting tentative routes to the prospect, the dealer will find a large map, one giving the counties, cities and principal towns, very useful. The laying out of the routes will, of course, depend to a great extent on the territory handled by the dealer and his location. Some dealers, who are located in large inland

The Type of Farmer Wagon That the Rural Motor Express Will Replace, Enabling the Farmer to Eliminate the Long and Tedious Haul to Market

cities, may possibly arrange as many as 15 or more separate routes. These may radiate from a common center, extending practically to all points of the compass. In some instances it may be well to arrange for the truck to cover a circuitous route. The roads, territory to be served, and its products as well as the shipping facilities provided by the common carriers are factors that should be given consideration.

One Prospect to Each Route

It is suggested that routes be marked off on a large wall-map, by utilizing either the conventional colored pins or buttons and strings much on the same principle as is employed to indicate sales. These routes can be numbered, and when a truck or trucks are sold and used on the route, mark it "sold" and credit the salesman on the map. Give the prospect a reasonable option on a suggested route and if he fails to take it up (and buy a truck) sell it, or rather give another prospect an opportunity.

The Return Load Feature

If the prospect is to make a success of the Rural Motor Express, and by success is meant make real money, he must be taught **to operate his truck or trucks with as nearly capacity loads as can be obtained and both ways.** This is particularly true if the trucks be operated on what may be termed a long haul.

The dealer will be able to advise the prospect how to obtain patronage of the farmer, and, through the co-operation of the Rural Express official of the Highways Transport Committee of the State, and other agricultural officials, how to be able in time to obtain capacity loads from the city to the country. If the Rural Motor Express is to be operated economically and profitably it is necessary that it at least pay for the operating expenses of the return trip by securing sufficient business for this trip.

Obtaining the Return Load

The concrete example of how the Long Island Rural Motor Express Company, N. Y., which is at present operating a fleet of trucks covering the south shore of Long Island, obtained business for its return loads, is suggestive. One of the routes begins on the island at Flushing, passing through and serving such towns as Jamaica, Springfield, Valley Stream, Lynbrook, Rockville Centre, Baldwin, Freeport, Merrick, Bellemore, Massapequa, Amityville, Babylon, Brightwaters, Bayshore, Islip, East Islip, Oakdale, Sayville, etc., with a terminus at Patchogue, 58 miles from New York.

At Patchogue there is a large wholesale produce dealer who, up to the advent of the Rural Motor Express, obtained his oranges, grape fruit, celery, bananas, grapes, etc., from New York through the medium of the railroad express service which is within a few blocks of the store. The Long Island Rural Motor Express Company convinced the head of the concern by one trial trip and the former now has the contract and is hauling on an average of 3 tons every other day.

Another instance of return load is that of supplying fish to the Long Island towns served by the New York wholesale markets. This may appear a singular statement in view of the fact that the Rural Motor Express daily hauls tons of fish to New York from Long Island but it is explained that there are certain varieties of fish in demand on the island that are not found in Great South Bay.

Merchants Welcome the Rural Express

J. Kent Warden, founder and president of the Long Island Rural Motor Express Company, which had been in operation but three weeks when this article was written, has reversed the usual procedure in establishing the service. In other words, he started in the winter and built up his return load, although at the present time his trucks are hauling to the city. After an intensive study of the subject and personal calls on the merchants, etc., of the towns he found that those not served direct by the wholesalers welcomed the Rural Motor Express. Its store door delivery, prompt and dependable service appeal very strongly to their commercial instincts.

Agents Solicit Business

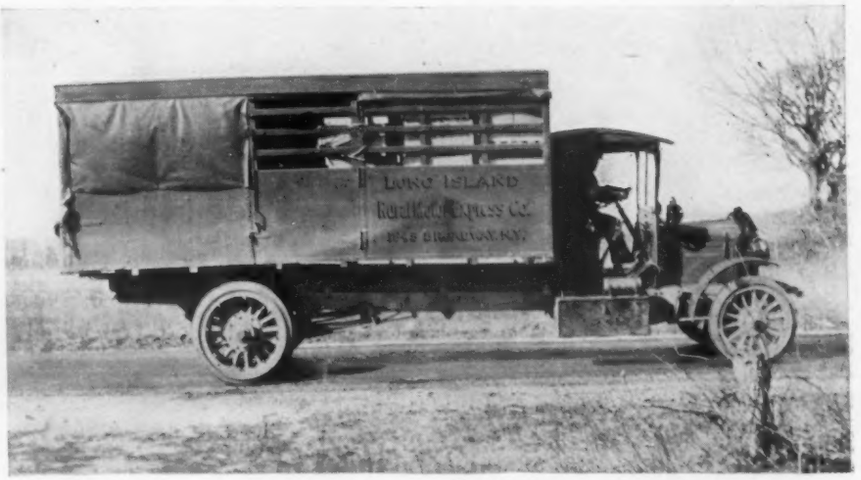
Mr. Warden believed that a personal presentation is essential to the success of the Rural Motor Express and appointed

Map of New Jersey, Showing Principal Cities and the Fruit and Vegetable Centers.

in each town agents who sell the service on a commission basis. These men, who were selected because of their acquaintance and knowledge of local shipping conditions, receive a commission on all business shipped from their territory. One of the agents in a certain town obtained the business of a manufacturer who ships regularly to New York City. The agent now has no work other than occasionally calling on the customer to see that the service is satisfactory or making any adjustment that may be necessary, but he still receives his commission on every pound of material shipped on the trucks. Copy carried in the Long Island papers aids the agents. No circularizing is done, all business being personally solicited.

Trip 70 Per Cent Efficient

At the invitation of Mr. Warden the writer made a trip to Patchogue on February 24. We left New York City shortly before noon with a 5-ton truck loaded with slightly over 3 tons of fruits and vegetables destined for the wholesale produce house previously mentioned. Unfortunately it was practically an express trip, although a couple of stops were made, as shown by the accompanying illustrations. Patchogue was reached about 4 o'clock and the agent gave the driver orders to make several pick-ups on the return trip. While the truck was being unloaded the writer talked with one of the owners of the store and among the questions asked was the inevitable one of why he used the truck instead of the railroad.



Illustrating a Type of Body Adapted to Rural Express Work, and Showing Door for Loading and Unloading at the Side

"Because it is dependable, and I get my fruits in better shape and fresher than by express and a darned sight quicker. Furthermore I can phone New York at noon and get goods here the same afternoon. I've got another shipment coming through on another one of Warden's trucks" was the quick reply.

(*Continued on page 100*)

Kansas City Tractor Show the Beginning of New Era

THE Fourth Annual National Tractor Show held in Kansas City, Mo., February 24 to March 1, will stand out in the history of the industry as one of its milestones.

No one who saw the hundred thousand square feet of exhibits, could fail to visualize the new era of power farming which the tractor is bringing about.

There was much in evidence to mark the beginning of a brighter day on the farm. The tractors themselves were great improvements over those shown in the days before the war. There were numerous refinements, and absences of the crudities of other days were noticeable. In the newer machines there was evidence that standard practices are being gradually adopted and that some definite bases are being reached in tractor designing.

The exhibits of the parts and equipment manufacturers were interesting, educational and indicative of great progress. Greater efficiency, simplicity and durability were seen in the products shown in every exhibit. The manufacturers have studied the problems of the farmer with his tractor in farm service. The new improvements are based not only upon scientific data but upon actual farm experience.

It was refreshing to note the spirit of the farmers who attended in thousands. There was a considerable element of the farmers not yet ready to invest in a tractor. But they were interested. It was evident that they are beginning to believe in the new doctrine of power farming. They have faith in it, but may perhaps be awaiting still further developments before actually buying. The significant fact which was dominant wherever farmers were gathered together was that power farming is a reality for the future.

Those who went to the show doubting that the whole system of farming is in a transitional, saw their doubts disappear as they looked over the exhibits of tractor farming implements. Perhaps there was no more apparent feature of the whole show than the improvements and changing designs of agricultural implements. But there was a noticeable tendency to improve farm machinery and adapt it to tractors.

The show was a success from every standpoint. The number of exhibits was at least fifty per cent. greater than at any previous show. The arrangements were much better. The building was tastefully and uniformly decorated, well lighted and heated. Visitors had all the comforts imaginable.

While termed a National Tractor Show, the fourth annual event at Kansas City exerted an influence far beyond that of national boundaries. There were present not only representatives of the United States Department of Agriculture but officials from numerous foreign governments, prominent among which were many representatives from the countries associated with the United States in the defeat of the Hun. They were there for definite purposes, not the least important of which was to study tractors with a view to making recommendations to their respective governments.

Another significant fact, due largely to the return of peace, was the presence of a number of representatives from the larger exporting companies. Several companies, whose business it is to ship tractors and tractor implements to foreign countries, had representatives on hand to study the exhibit and made connections with the manufacturers of desirable products for foreign fields. A number of foreign connections were actually completed within the big show building. Thus the show assumed world wide importance in its results.

Guy H. Hall, manager of the show, said that he believed the show would result in direct business approximating two and one-half million dollars.

Too much praise cannot be given the members of the Kansas City Tractor Club, the originators of the National Tractor Show, and under whose direction all the shows have been held. It required months of untiring effort on the part of Secretary Hall, President James Patrick Smith, and other members who made the show the big success it was this year. It was with considerable satisfaction that the members of the tractor industry learned before the show was over that Secretary Hall was to remain in charge of next year's show and all predicted a successful event in 1920.

Members of Tractor Industry Enjoy Novel Entertainment

The Pipe of Peace Pow Wow, held Wednesday evening of Kansas City Tractor Show week, at the Muehlebach Hotel, not only brought together the leaders in the tractor industry from the four corners of the United States, but it also provided them with a most novel entertainment.

The south and west mezzanine floors of the hotel were closed off from the remainder of the house, and entrance to these was gained through a gate which admitted the guests to a realistic stockade, which in turn opened on to the blazing main street of a typical mining town of the early southwest.

At the upper end of the street a 'dobe house gave forth appetizing odors of grilled buffalo meat. Here a bent old squaw attended the cooking meat over a bed of glowing coals, while her companion stilled the cries of the papoose strapped to her broad back.

The Wild Cat Saloon blazed forth its seduction on one side of the street. The force of old-time bartenders were kept busy all evening handing out drinks which ranged from the kind that graced those rough board bars of the olden days down to the most seductive of the modern brand.

Placards told customers what they could not do, flaring posters heralded fights to come, and statuesque beauties from the covers of current Police Gazettes adorned the walls. The mirrored back bar was even protected by the regulation mosquito bar. Every detail that would more perfectly help to aid the illusion was used.

Near the Wild Cat was the Eagle Lunch Room, where husky biscuit shooters tossed food over the counter to the hungry. But this food was very different from the grub at the old-time mining camp. Anything the guest wanted was his for the ordering, with a modern hotel menu to choose from.

Across the street, the Opera House, with its kerosene foot lights, its graceful proscenium arch, and its flaunted announcement of "Next week, East Lynne," was a center of attraction all evening, and there a company of entertainers made merry till early morn. A band made music of the jazziest kind for this troupe, while overhead gamblers and miners, dance hall girls and women of the range, held forth in the row of boxes which were always a part of the old time dance halls and entertainment palaces.

Below these boxes sleek-looking gentlemen of fortune presided over the old games of chance: faro, chuck-luck, roulette and others. The imitation money used didn't seem to dampen the ardor of those who sought entertainment at this fascinating place, and crowds surged around the tables all evening.

Overhead, in this wild west mining town, a deep purple sky glowed with the twinkle of hundreds of stars.

Around three sides of the room, and linking the affair definitely with the big

The 'Dobe House, the Opera House, Wild Cat Saloon, the Entertainers and the Main Street; Some of the Features of the Pipe of Peace Pow-Wow

tractor show, was a series of scenes showing the progress of agricultural methods, and so arranged that they seemed part of the picture, a something seen somewhere between the tops of the buildings and the far horizon in the light from the stars above.

Leaving the main street, the guests entered the town dance hall, where a modern jazz orchestra kept feet a-shuffling all the evening. Typical "tough-guy" waiters of the old days, minus coats, or vests, or collars, served liquid refreshments at tables between dances.

A peddler of shoestrings, collar buttons and knick-knacks; an old prospector with his sleepy-eyed burro; a hand-organ man and his monkey; Indians and Chinamen, bad men with guns on both hips, and other denizens of the old-time mining towns, all added local color.

The Chilton Company, publishers of CHILTON TRACTOR JOURNAL, COMMERCIAL CAR JOURNAL and AUTOMOBILE TRADE JOURNAL, were hosts at this novel affair and highly esteemed the privilege of entertaining the men of the industry in a way that would give them happy memories of their trip to the annual Kansas City Tractor show. No effort was spared to make the event of the happiest, and there was every indication that the guests enjoyed themselves to the full.

News of the Trade in Brief

Used Trucks Subject of Discussion at Dealers' Meeting

NEW YORK, March 6.—Solutions for several of the problems relating to the used truck were suggested by E. W. Clark, of the Clark Equipment Company, at the meeting of dealers at the Automobile Club of America.

The dealers in a well known city, Mr. Clark said, were pursuing their individual ways and, in many instances, were decidedly antagonistic to each other, with many fancied grievances. This condition exists in many other cities today. Six or seven of these dealers were brought together at a luncheon by an interested party. Here it was found that practically all of the trouble had been created by the shopping type of prospect. Other meetings were held and an organization perfected.

A large initiation fee was adopted to eliminate the would-be agent, the type of dealer who "carries his office in his hat," and who employs used trucks to jockey new sales. The type of "dealer" who obtained an agency in order to take advantage of the discounts was likewise tabooed. Any dealer who was invited to join the association and dallied, had his dues dated from the time he was asked to join.

The organization was capitalized for $25,000, and members bought stock in amounts from $500 upward. The capital was paid in. There were fairly heavy dues which were largely utilized to promote the annual show, at which only members of the association were alloted space.

The plan of handling the used truck was as follows:

An executive board controlled the action of an expert appraiser engaged by the association. The keystone of the plan was the integrity of the appraiser, but as he was working on close limits and checked, the results were satisfactory. Whenever a prospect desired to trade in a used truck the appraiser was called upon to value it, and the appraisal of all trucks was on record at the secretary's office. The data included model, price, etc. Bulletins were issued, showing all transactions.

Immediately upon making the trade the dealer sent the used truck to the clearing house and received in return cash at the appraised value. The truck was then placed on the floor and sold as is. Any member of the association had the privilege of purchasing the truck at the appraised price if he so desired. Members of the association and their salesmen were allowed to sell cars from the floor of the clearing house on a commission basis. Purchasers desiring to have a car overhauled naturally went to the service station of the dealer for parts or work. The dealer assumed no responsibility for his used trucks, as they were sold by the clearing house as is. The trucks were sold on the time payment plan. The financing plan, as explained by Mr. Clark, was entirely feasible.

The method of dealing with a member who transgressed the rules and ethics of the association consisted of a plan of posting the expelled member in the newspapers, and without any possibility of the member taking recourse of the law. Of course, he might sue, but it is said that the plan has and will stand the acid test.

A method was also outlined by Mr. Clark whereby the association, which is nearly four years old, dealt with that class of dealer whose tactics are questionable. Invariably, he said, the young and inexperienced dealer was made to see the error of his ways, and in many instances became a credit to the trade. The other type was disposed of by a process of evolution speeded up by the policies of the association.

As a result of Mr. Clark's address a committee was appointed to draw up a prospectus of the plan to be adopted, and another to call and personally explain it to those dealers not present at the meeting.

A motion was carried instructing the secretary of the Dealers' Association to draw up and forward a resolution suggesting to the proper authorities at Washington that the army trucks not in use abroad by the army of occupation be given to Belgium and France, and that a copy of the resolutions be sent the National Automobile Chamber of Commerce and other organizations.

Vehicular Tunnel Bill in Senate at Albany

NEW YORK, March 6.—The New York-New Jersey venicular tunnel bill, appropriating $1,000,000 for immediate work, was favorably reported in the Senate, at Albany yesterday. It can be passed next week.

The tunnel proposed is designed for two roadways, one above the other, each having a capacity for three lines of trucks, also suitable walks for pedestrians. The two roadways will be each 24 ft. 6 in. wide, and air ducts will distribute fresh air throughout the tunnel by means of adjustable openings. There will also be an exhaust air duct on either side of the tunnel, and exhaust blowers, etc., will renew the air supply every 10 minutes, so that the exhaust of automobiles will not affect the users of the tunnel.

The total length of the tunnel will be 8,350 ft., and the level of the lower roadway will be 89 ft. below the surface of the Hudson river. The tunnel will provide direct connection along Canal St. with the Manhattan and Brooklyn bridges, and is near the Williamsburg bridge, as well as the main arteries of uptown travel. On the Jersey side the location gives access to either the low level sections of Jersey City and Hoboken, or to the heights, via the viaduct.

The advantages of the tunnel have been pointed out in these columns, but it is timely to add that with the present harbor strike, those industries, merchants, etc., affected by it would welcome the tunnel at the present time. It is expected that it will effect a great saving in time as well as lower the cost of commodities.

Gramm-Bernstein Sales Direct From Factory.—A. E. Schafer, general sales manager of the Gramm-Bernstein Motor Truck Co., Lima, Ohio, has notified Gramm-Bernstein dealers in the eastern territory that henceforth sales and service in that territory will be directed from the factory. Until recently this section had been in charge of C. W. Moody, as distributor, operating as the Gramm-Bernstein Sales Corporation, with offices at New York, Philadelphia and Akron, Ohio.

Motor Transport Corps Taking Inventory of Equipment

WASHINGTON, March 3.—Members of the Motor Transport Corps who are engaged in taking an inventory of all motor vehicles owned by the Army are confronted with a huge task. This inventory will include every motor vehicle used or owned by the Army, and all equipment including spare parts, machine shop parts, machine parts, and accessories of all kinds.

Many motor vehicles were taken over formally by the Motor Transport Corps, having been bought and operated by the Ordnance, Quartermaster, Medical, Signal and other branches of the Army, and inventories were never made. All these machines and their equipment will now be accounted for in the Motor Transport Corps inventory. which is being made by eighty-eight officers and five enlisted men.

The country has been divided into districts, with a district officer in charge at each point. A school has been established for instruction of officers in inventory work.

State Highway Officials Confer With the Secretary of Agriculture

WASHINGTON, D. C., March 1.—Representatives of the highway departments of 27 eastern, southern and middle western states were told this morning by the Secretary of Agriculture, David F. Houston, that the Department desires to give every possible help in expediting resumption and progress of highway building, under the Federal Aid Road Act.

Expenditures for highway work in the United States this year are likely to amount to a half billion dollars, or even more, according to statements made by officials of the Bureau of Public Roads, United States Department of Agriculture. On reports received from state highway departments, the bureau estimates the expenditures for roads and bridges at $385,000,000, or $110,000,000 more than the average expenditures for 1916 and 1917. This estimate does not include, however, the additional Federal funds which will be available through the enactment of the amendment to the Post Office Appropriation Bill, making $50,000,000 immediately available and $75,000,000 more on July 1.

Estimated work under control of the state highway departments includes $45,000,000 for the construction of 5000 miles of road now under contract; $30,000,000 for 4000 miles of construction ready for contract; $100,000,000 for 16,000 miles of contemplated construction, and $60,000,000 for maintenance of 200,000 miles. Expenditures of counties, townships and local road districts are estimated at $100,000,000 for the construction of 15,000 miles, and $50,000,000 for maintenance of 100,000 miles.

Changes in the Berling Organization

BUFFALO, N. Y., March 12.—Further plans for the development of the Berling magneto were put under way at a recent sales conference at the factory of the Ericsson Mfg. Co.

In addition to the appointment as engineering manager of Roger Chauveau, former chief of Division of Ignition, Production and Inspection of the Bureau of Aircraft Production during the war, the following additions to the sales organization were announced:

Lee C. Carlton has been appointed district manager of the mid-west district, with offices in the Century Bldg., Chicago.

G. R. Nauth has been put in charge of the Michigan and Ohio territory, with headquarters in Detroit.

Another addition to the sales organization is H. C. Anderson, who was formerly sales manager of the John O. Heinzs Company, of Springfield, Ohio, and who, during the war, has been District Chief Engineer in charge of the Dayton district for the Bureau of Aircraft Production.

National Truck Shows for 1920

At the regular monthly meeting of the N. A. C. C., New York City, March 6, the subject of National Shows was discussed at length. It was finally determined that the manufacturers would hold national shows in 1920 in New York and Chicago. It was also agreed that a truck show would be staged at the same time as the passenger shows in both of these cities. This will evidently require in Chicago the use of more space than formerly, for it is understood that the accessory people will exhibit. In New York the Palace, if available, will probably be sufficiently large to care for the entire exhibit. No further details are available at this time.

Chamber of Commerce to Meet in St. Louis

WASHINGTON, Feb. 20.—The seventh annual meeting of the Chamber of Commerce of the United States of America will be held in St. Louis, Mo., on April 29, 30 and May 1. The sessions of the meeting will be held in the Coliseum. The headquarters for the Board of Directors and Committees will be located at the Statler Hotel.

Charlotte Dealers' Association Elects Officers

CHARLOTTE, N. C., Feb. 1.—A. A. Knee was elected president of the Charlotte Automotive Dealers' Association at a recent meeting. Other officers of the association are: A. Burwell, Jr., vice-president, and T. J. Mitchell, secretary.

The New Taxes Which Affect Motor Trade

Extracts from the new law taking effect Feb. 25th, 1919:

Sec. 900. That there shall be levied, assessed, collected and paid, upon the following articles sold or leased by the manufacturer, producer, or importer, a tax equivalent to the following percentages of the price for which so sold or leased:

457. (1) Automobile trucks and automobile wagons, (including tires, inner tubes, parts and accessories therefor, sold on or in connection therewith or with the sale thereof), 3 per centum;

458. (2) Other automobiles and motorcycles, (including tires, inner tubes, parts and accessories therefor, sold on or in connection therewith, or with the sale thereof), except tractors, 5 per centum;

459. (3) Tires, inner tubes, parts or accessories, for any of the articles enumerated in subdivision (1), (par. 457), or (2), (par. 458) sold to any person other than a manufacturer or producer of any of these articles enumerated in subdivision (1), (par. 457), or (2), (par. 458) 5 per centum.

Jobbers and Dealers do Not Pay Tax on Stock on Hand

It will be noted that the above tax is to be paid by the manufacturer or importer, and in reply to an inquiry at the office of the Collector of Internal Revenue at Philadelphia, it was stated that jobbers and retailers do not have to pay any of the above taxes on the goods they have on hand and, of course, on the goods they buy from the date of the law, the manufacturer must include the tax in the price of the goods, so that the taxes apply only to the goods delivered by manufacturers after passage of the law.

N. A. D. A. Has New Offices

ST. LOUIS, MO., Feb. 23.—The National Automobile Dealers' Association is now occupying a suite of four offices at 3124 Locust St.

The new location is in the center of the automobile district of St. Louis, and the move was part of the policy approved at the Chicago meeting.

There is a great amount of work to be done, and Manager Harry G. Moock is preparing plans for systematizing the work and increasing the office force in order to get material in shape for publication or filing.

Indianapolis Trade Association Elects Officers

INDIANAPOLIS, IND., March 1.—Officers elected for 1919 by the Indianapolis Automobile Trade Association are: A. B. Wagner, president; N. H. Cartinhour, vice-president; H. C. Lathrop, treasurer; A. W. Hutchinson, secretary.

Trailer Manufacturers Form Association

CINCINNATI, OHIO, March 1.—Twelve of the leading trailer manufacturers were present at a meeting held February 20, for the purpose of perfecting the Trailer Manufacturers' Association of America.

The members are enthusiastic over the future of the association, and are confident that it will accomplish great good for the trailer industry in general.

Questions relating to advertising, publicity, sales policies, financing, freight classification, standardization, legislation and good roads were discussed in detail at the meeting.

The matter of co-operating with the truck manufacturers was taken up, and it was decided to protect in every way the interests of the truck industry.

The discussion on this topic was led by H. M. Wood, sales manager of the Trailmobile Company, who advanced the idea that in all advertising and selling of trailers there should be no suggestion that the trailer takes the place of trucks or makes trucks unnecessary, but rather that by reducing hauling costs, it makes it profitable to use trucks under conditions where they could not otherwise be used, and thereby increases the field for both trucks and trailers.

Mr. Wood took for his text a recent trailer advertisement which carried the headline, "Do you really need another truck or just its carrying capacity?" and indicated that as the type of advertising and selling that the trailer manufacturers must avoid for the benefit of themselves and the truck people.

He showed that truck manufacturers are beginning to co-operate actively with trailer men by suggesting trailers, and even selling them. He displayed scores of recent advertisements of truck manufacturers clipped from various publications in which trailers are illustrated or the trailer idea treated in the copy.

This, he held, was conclusive proof that the truck men now recognize that the trailer manufacturers are of assistance to them in reducing road transportation costs and in increasing the field for trucks. The meeting unanimously adopted the line of policy which will lead to closer co-operation with truck makers.

The objects of the association are to encourage the introduction and use of trailers; to further the construction of good roads; to aid in the enactment of suitable traffic laws; to obtain and distribute information for the use and benefit of its members; to do everything suitable toward the general advancement of the trailer industry and of trailer dealers.

Officers were elected as follows: W. E. Ferris, Ohio Trailer Co., president; W. A. Murfey, King Trailer Co., 1st vice-president; R. C. Sykes, Troy Wagon Works Co., 2nd vice-president; J. C. Endebrock, Trailmobile Co., Secretary-treasurer. Additional members of the executive committee are: W. R. Bond, Detroit Trailer Co.; W. F. Jolley, Miami Trailer Co., and C. H. Martin, Martin Rocking Fifth Wheel Co.

M. & S. Gear Corporation Reorganized

CLEVELAND, OHIO, Feb. 16.—The M. & S. Gear Corporation announces the removal of its headquarters from Detroit to Cleveland.

W. T. Walker, formerly president of the Walker-Weiss Axle Co., has been appointed president and general manager.

L. O. Haskins has been appointed sales manager of the company. Mr. Haskins was formerly general manager of the O. & S. Bearing Co., and for the past two years has been with the Quartermaster's Corps in charge of truck production in the Chicago district.

R. S. Townsend, formerly with the Walker-Weiss Axle Co., has been made factory manager.

The name of the company's product has been changed from the M. & S. Differential to the Powrlok, and will be marketed under this name. The Powrlok has been adopted as standard equipment on Torbensen, Timken and Clark axles, and is also standard equipment on the Nash Quad.

Dart Announces Changes in Organization

The Dart Truck and Tractor Corp. has reorganized its district representatives.

A. W. Cook remains, with territory reduced, so as to give closer co-operation with dealers and distributors. He will have charge of Iowa, Nebraska and South Dakota.

M. W. Cline will represent the factory in Kansas, Missouri and Oklahoma.

R. C. Zethraeus will have charge of Texas and Louisiana, with headquarters at New Orleans.

A. H. Kreitler will cover Arkansas and Mississippi, with headquarters at Little Rock.

H. P. Federspiel will look after the factory interests in Indiana, Illinois and Kentucky.

Atlantic seaboard and export distribution will be handled entirely by the Maxim Munitions Corp., New York City.

Automotive Products Corporation to Meet

NEW YORK CITY, March 10.—The Automotive Products Corporation announces that the annual meeting of stockholders will be held at the office of the company on Tuesday, March 18th, 1919, at 3 o'clock, when an election will be held for directors to serve for the ensuing year, and for the transaction of such other business as may lawfully come before the meeting.

Newark Truck Show Expected to Boost Sales

NEWARK, N. J., Feb. 19.—Dealers exhibiting at the annual show in the Armory, which opened Feb. 15 and closed Feb. 22, were very optimistic as to the future. The majority of those exhibiting, and there were 22 makes in the commercial car section of the show, believe that there is to be a big demand for trucks, and are shaping their campaigns accordingly.

While it is true that some of the show models seen at New York were exhibited, the local show included two makes not displayed at New York, namely, the Pierce-Arrow and Selden. Altogether there were 39 models, with the Day-Elder and Federal sharing the honors for the largest exhibit. Indicating the tendency to dress the truck in more attractive colors was the special paint job of the two Service chassis and those of the Federal.

On Tuesday evening the Motor Truck Club of New Jersey attended in a body, and previous to inspecting the trucks listened to an address on "The Future of the Motor Truck Industry," by E. S. Foljambe, directing editor of the Chilton publications. The meeting was well attended.

Bristol to Have Great Southern Show

BRISTOL, VA.-TENN., Feb. 18.—The Great Southern Automobile Show, C. W. Roberts, general manager, will be held at Bristol, Virginia-Tennessee, during the week of May 10th. Announcement to this effect has been made by the Bristol Chamber of Commerce under whose direction the show will be held.

The show will include passenger cars, trucks, tractors, trailers, accessories, tires, used tires, used cars, farm implements and airplanes.

A special exhibit building, one story high, constructed with pressed brick front, is expected to be finished by April 1st and will house the main part of the show, including passenger cars, trucks and tractors. Special arrangements will provide ground space for the demonstration of tractors.

Over 60 jobbing houses operate in Bristol. Thousands of merchants come to Bristol to buy, and during show week the annual merchants' week will be held and merchants who come to Bristol will have their railroad fares paid both ways. A number of these merchants handle automobiles, tires and accessories, and are interested in tractors and trucks.

M. T. A. Beefsteak Dinner

NEW YORK, March 1.—The annual beefsteak dinner of the Motor Truck Association of America, Inc., will take place at Churchills, Wednesday evening, March 19, at 7 o'clock. A number of well known State, City and Highway officials have been invited to speak on subjects pertinent to transportation and the commercial car industry.

United States Trade With Turkey and Bulgaria is Resumed

WASHINGTON, Feb. 21.—The War Trade Board announces that the resumption of trade is hereafter authorized between this country and Bulgaria, as well as the Turkish Empire, both in Europe and in Asia Minor.

Decision to this effect was reached February 15, by the supreme economic council in Paris.

This step will throw open the Dardanelles, and consequently Roumania and all the ports of the Black Sea to trade with this country, and it will serve as a measure of relief to Armenia and all South Russia.

In addition to the already announced reopening of trade with Mesopotamia, Syria, and Palestine, south of the line from Alexandretta to Aleppo, this announcement by the War Trade Board signifies the resumption of trade with the entire territory embraced within the boundaries of the Turkish Empire as it existed on August 1, 1914.

Chinese Consul-General Gives Advice to American Merchants

"American Goods and Foreign Markets," a pamphlet published by the Guaranty Trust Co., New York City, contains an account of an address by Chao Hsin-Cho, Chinese Consular-General at San Francisco, in which he tabulated the following factors as necessary to secure the success of American trade ventures in his country:

1. Granting sole agencies to Chinese firms;
2. Permanent advertising in Chinese newspapers and periodicals;
3. Irremovable labels and brands;
4. Establishment of permanent expositions of American products;
5. Frequent visits of American commercial missions, not to the Treaty Ports alone, but to the interior as well.

Mr. Chao was speaking of course from the Chinese point of view, but commentators here said that abolition of the arbitrary charges called "Likin" imposed by the officials of the interior, is a factor equally to be considered.

Chinese journals tell that a new line, to run steamers to America, is about to be formed. Its name will be the Chinese Pacific Steam Navigation Company.

Fairs to be Held in Switzerland and Finland

The Third Swiss Sample Fair will be held in Bale from April 24 to May 8, 1919, according to official announcement made here. The two previous fairs have been so successful that the exhibition will probably be a permanent feature of Swiss commercial life.

The new Republic of Finland plans to hold a national fair during the summer of the present year, and American manufacturers are to be invited to participate.

Australia Will Buy American Goods, Sydney Importer Says

NEW YORK CITY, Feb. 19.—"There is a market in Australia for American goods of some kinds, such as oils, automobiles, machinery and steel * * * but the American manufacturer must adopt a different policy toward Australia," said Frank B. Smith, a prominent importer, of Sydney, who is at present in New York conferring with American merchants. The American manufacturer, Mr. Smith says, must develop a proper appreciation of the value of Australian markets and the possibilities which are offering as the result of the German trade done with Australia prior to the war, but which, he says will never be revived.

Manufacturers in Australia have not progressed proportionately to the natural advantages offered them, Mr. Smith says, and the market is therefore favorable to American goods.

The Polish National Department Establishes Trade Bureau

NEW YORK CITY, Feb. 20.—The Polish National Department has established a commercial and industrial bureau, with headquarters at 1032-35 Aeolian Bldg., 33 W. 42nd St., New York City. This bureau has for its object the establishment of commercial connections between firms in the United States and Poland, and the collection of data and information which would form a basis for the work of the future official Polish commercial agencies in this country.

The Polish National Department, in making this announcement, states that "it is in the interest of all the Allies that Poland should be given immediate assistance to supply the needs of its people, to re-establish its production and to become a strong wall against German expansion to the East; thus American manufacturers have a vast field in Poland for the export of their products."

Dart Officers Elected

At the annual meeting of the Dart Truck and Tractor Corp., C. C. Wolf was elected president. Mr. Wolf has for some time been connected with the Dart organization as treasurer.

W. H. Johnson, chief engineer, was advanced to the post of vice-president and general manager. Mr. Johnson will have entire charge of plant production.

M. D. Herron was advanced to the office of vice-president and sales director.

E. L. Stover retains the office of secretary, and in addition assumes the work of treasurer. Mr. Stover, as the oldest member of the Dart organization, has assisted most materially in the present satisfactory standing of the company.

H. H. Henry, the retiring president, has accepted the vice-presidency of the Maxim Munitions Corp., Atlantic seaboard and export distributor of the Dart line.

January Record-Breaking Month for Exports

WASHINGTON, Feb. 24.—January exports exceeded in value the total for any previous month in the history of American commerce, according to a statement issued by the Bureau of Foreign and Domestic Commerce.

The export figures announced for January were $623,000,000, as against a total of $566,000,000 for December, and $505,000,000 for January of last year. Only twice before have exports reached the $600,000,000 mark. During the seven months of the fiscal year, ended with January, the exports totalled $3,798,000,000, as compared with $3,450,000,000 for the corresponding period of the previous year.

The excess of exports over imports in January was $410,000,000, an impressive total when it is remembered that the excess of exports for the entire fiscal year 1914, the last normal year, was only $470,000,000.

Trade With Latin-America

The total value of trade during 1918 between the United States and Latin-America, according to figures compiled by the Guaranty Trust Co., of New York, was $1,046,943,000 as compared with $1,648,202,000 in 1917, the increase being due to an expansion of imports from $977,849,000 in 1917 to $1,046,943,000 last year. The value of exports from this country was $668,240,000, compared with $670,353,000 in 1917. During the year exports to Argentina declined from $107,098,000 to $105,215,000, and imports increased from $173,245,000 to $227,128,000. Exports to Brazil declined from $66,157,000 to $57,422,000 and imports decreased from $145,274,000 to $98,038,000. Exports to Chile increased from $57,449,000 to $66,399,000 and imports increased from $142,597,000 to $165,782,000. Exports to Mexico declined from $110,829,000 to $97,845,000, and imports increased from $130,526,000 to $158,937,000. Exports to South America totalled in value $302,840,000 as compared with $311,893,000 in 1917 and imports to all South American countries were valued at $609,371,000 as compared with $598,818,000.

Gramm-Bernstein Prices Not Reduced

In the February issue of the COMMERCIAL CAR JOURNAL we made the statement that the Gramm-Bernstein Motor Truck Co., of Lima, Ohio, had reduced the price of its 1½-ton truck. This was a mis-statement. The prices of the company's trucks have not been reduced, and are as follows: Worm drive, 1½-ton truck, $2450; Internal gear drive, 1½-ton truck, $1895.

Have You Done Your Share to Make Roads Better?

National Foreign Trade Council Completes Convention Program

The National Foreign Trade Council has assembled a large amount of valuable technical information, which is available to all delegates to the Sixth National Foreign Trade Convention to be held at the Congress Hotel, Chicago, April 24, 25 and 26. This information will be furnished by the volunteer trade advisors of some of the most experienced business houses and by the representatives of the government trade agencies. A number of prominent business men of long experience in every branch of foreign trade have offered their services as volunteer advisors. The information they can give is based on personal experience. In addition, the Department of the State will co-operate by assigning to the convention some members of the Consular Service, who will just have returned from Europe, Latin America and the Far East. The Department of Commerce will send a number of its experts from the Bureau of Foreign and Domestic Commerce. The Shipping Board will be represented. The Pan-American Union will be present to give information on Latin-American relations.

A tentative program is announced as follows:

First Day, Thursday, April 24th

Convention called to order at 10 A. M. by James A. Farrell, chairman of the National Foreign Trade Council.

Organization of convention—Election of presiding officers, secretaries, etc.; address of president of convention; appointment of general convention committee. Session topic: America's Need of Foreign Trade, from the viewpoint of production, finance, labor and imports.

Afternoon session, 2.30 P. M.—Session topic: Post-War Foreign Trade Problems, a series of addresses dealing with general foreign trade matters.

Evening session, 8 P. M.—Group sessions.

Group I. Commercial Education for Foreign Trade.

Group II. Foreign Trade Merchandising, in co-operation with the American Exporters and Importers Association.

Group III. Financing Foreign Trade, in co-operation with the American Bankers Association.

Group IV. Advertising for Foreign Trade.

Second Day, Friday, April 25th

Morning session, 10 A. M.—Session topic: The American Merchant Marine, in which will be considered American shipbuilding, provision of cargoes, establishment of trade routes and return cargoes, inland waterways, American and foreign navigation systems and the formation of an American maritime policy.

Afternoon session, 2.30 P. M.—Group sessions.

Group V. Foreign Credits, in co-operation with the National Association of Credit Men.

Group VI. Direct Selling, in co-operation with the American Manufacturers Export Association.

Group VII. Export Combinations, describing the Webb Law in actual operation.

Group VIII. Ocean Service, in co-operation with the American Steamship Association.

Friday evening, 7 P. M.—Banquet, Congress Hotel.

Third Day, Saturday, April 26th

Morning session, 10 A. M.—Reports of group sessions, report of general convention committee, miscellaneous business, adjournment.

This year the convention has assembled a large amount of valuable technical information, which is available to all delegates who wish to use it. This information will be furnished by the volunteer trade advisors of some of the most experienced business houses and by the representatives of the Government trade agencies. A number of prominent business men of long experience in every branch of foreign trade have offered their services as volunteer advisors. The information they can give is based on personal experience. In addition, the Department of the State will co-operate by assigning to the convention some members of the Consular Service, who will just have returned from Europe, Latin America and the Far East. The Department of Commerce will send a number of its experts from the Bureau of Foreign and Domestic Commerce. The Shipping Board will be represented. The Pan-American Union will be present to give information on Latin-American relations.

The work of organizing the convention is being handled by O. K. Davis, secretary of the National Foreign Trade Council, 1 Hanover Square, New York City. Requests for hotel reservations should be addressed to H. H. Merrick, chairman Hotel Committee, Chicago Association of Commerce, 10 S. La Salle St., Chicago.

U. S. Consulates in Belgium Re-established

WASHINGTON, Feb. 15.—The State Department has recently re-established the American consular offices in Belgium. The following were the original assignments made: Henry H. Morgan, consul general, Antwerp; Arthur McLean, consul, Brussels; Chas. R. Nasmith, consul, Ghent, and J. Preston Doughten, consul, Liege. Owing to the death of Mr. McLean while enroute to his new post, Mr. Nasmith is now temporarily in charge at Brussels. Mr. Doughten has taken charge at Liege, and Mr. Morgan sailed from New York on February 7.

Trade With German Colonies Resumed

WASHINGTON, March 3.—Immediate resumption of trade between the United States and all German colonies throughout the world has been announced by the War Trade Board.

This authorization permits all persons in the United States, subject to the rules and regulations of the War Trade Board, to trade and communicate with persons residing in colonies which were owned or controlled by Germany on August 1, 1914. This extensive authorization will include the areas in Africa known as German East Africa, German Southwest Africa and Kamerun. It also includes Kiaychau in Asia. Among the islands of the Pacific included are Bismarck Archipelago, Caroline Islands, Solomon Islands and Marshall Islands, as well as German Samoa.

In opening all these German colonies to the resumption of trade, the War Trade Board stated that applications will hereafter be favorably considered for licenses to export or import all commodities to consignees or from consignors in such territory.

Shipments to Finland

WASHINGTON, Feb. 18.—The War Trade Board announces that arrangements are now being made whereby it is hoped shipments to Finland may very shortly be resumed.

It is probable that there will be an Inter-Allied Committee sitting at Helsingfors which will pass upon all requests for importations into that market from the Associated Governments. Exporters in the United States who are interested in trade with Finland should therefore communicate as soon as possible with their correspondents in Finland and request them to get in touch with the American Consul at Helsingfors.

Trade Resumed With Servia and Roumania

WASHINGTON, Feb. 4.—The War Trade Board announces that all persons in the United States are authorized, subject to the rules and regulations of the War Trade Board, to trade and communicate with persons residing in Servia and Roumania.

For the exportation of commodities to Servia and Roumania, application should be filed on Form X or X-A.

The War Trade Board has received no official advices as to what the import regulations into this territory, if any, will be. Prospective exporters should therefore communicate with their customers abroad before making shipments, in order that the importer may comply with any import regulations that may be in effect.

EDITORIALS

Railroads and Their Attitude Toward Highways Transport

THERE are conflicting statements as to the real attitude of the railways toward the short haul of less than carload shipments. There is no question that during the period of the war all of the railroads were very glad to be relieved of this traffic. Now, however, there are increasing rumors of efforts on the part of the railroad to regain that portion of the short haul traffic which has been taken over by motor driven vehicles on the highways. There is an undercurrent, which must be recognized by the trade, which, it is believed, emanates from those interested in transportation by rail, and which is against the permanent acquisition by motor trucks of the short haul freight of the country.

The trend of events in England where the Government recently decided to take over the railways as a state concern is of interest in view of the present control by our own Government of the railroads in this country. Indeed, what is occurring in Europe may be a portent of what may occur in this country, if the government ownership and operation of railroads becomes a permanent reality. Almost coincident with the decision in England for government operation of the railroads, the ministry of reconstruction recommended that thinly populated country districts should be served, not by motor driven vehicles, which have proved so efficient as highway transportation units, but by an extensive system of two-foot gauge light railways. These, it was proposed, should be laid along highways where road width permitted and along the land paralleling narrow roads. These narrow gauge railroads would not lead to the markets, but to the main railways. They have the same inflexibility inherent in all railways.

Another thing, however, of even greater importance, in connection with short hauls, is the fact that the railroad cannot eliminate the many handlings which hauling by railroad entails. Here is where the motor trucks will always have the advantage. Less labor is required, more time is saved, and the fewer handlings insure minimum damage to the goods.

Railroad interests, not only in this country but abroad, have felt the effects of trans-shipment over the highways by means of trucks. Whether it is admitted or not, an antagonistic spirit has been engendered on the part of railroad interests. This is not to be wondered at and is the usual result where one's business is even in part jeopardized by outside interests.

We believe that the railroads of England are overlooking one of the greatest assets available to them as mobile and elastic feeders to their lines—the motor truck. We feel that the motor truck industry of this country should take every step possible to prevent government ownership or control of railways, which would, in all probability, lead to similar schemes detrimental to the future of highways transportation. Motor truck interests must recognize this under current and be alert and on guard to protect highway transportation interests, for in this direction lies the aurora-clad future for the truck.

Are you keeping yourself informed on the legislation that is being passed in your State? Are you watching the activities of the railroad interests in your community? If not, get busy!

Why Scour Out the Inside of the Engine With Road Dirt?

THE tractor manufacturers have had their attention forcibly called to the necessity for filtering and straining every particle of air that passes through the intake into the interior of the engine. Strainers, air filters, air washers, etc., ought to be found on every high-grade machine.

In certain sections of the United States a tractor, without such a filter, will not stand up more than a few weeks, due to the fact that the entire inside of the engine is scoured with dust, contained in the air, which passes through the carburetor and into the cylinders. Bearings are worn to paper thinness, and the engine soon loses its compression and ability to work. It means the cylinders must be rebored and the rings replaced, laying up the tractor for some time, to say nothing of the expense.

Although this condition does not exist to the same extent in connection with trucks, still it does exist but in a modified form. The results are identically the same, except that it takes a little bit longer.

This is particularly true of trucks which are used in the arid, sandy desert region of the United States, and now that highway transportation is an assured fact, trucks must be used over these desert sections. It is also true of trucks which go down into excavations where dirt and dust is in the air,

where powdered trap rock and other abrasive material is sucked in at every breath of the engine.

Tests have shown that fully 60 per cent. of the so-called carbon in an engine is nothing more than road dirt. It is just as important to strain or filter the air that enters the intake of a truck engine as it is to do the same thing to the air that goes into a tractor engine.

In spite of these facts, however, every maker is not only disregarding this preventable damage to his engine, but he is even encouraging it by placing a fan in front of the engine and sucking in all the dust and dirt that can be found and so driving it into the intake pipe, lest some of it may not get into the engine.

This is not only unnecessary, but foolish in the extreme. There is no reason why a protector cannot be placed back of the fan, guiding the air current, after passing through the radiator, in such a way that the dirt contained in the air current will not go into the intake. Suitable washing or filtering apparatus can also be provided on the intake pipe by placing the intake pipe within a closed screened compartment so that no road dirt can by any means get into the inside of the combustion chamber.

Trucks may be complete in many respects, but they are certainly not complete in this regard, and it is high time that, in this day and age of refinement, the designers take heed of this matter and give it due consideration.

Electric Storage Battery Company Holds Convention

PHILADELPHIA, March 10.—The Electric Storage Battery Co. recently concluded its five-day Victory Convention, which was held at the Bellevue-Stratford Hotel.

The officers of the Electric Storage Battery Co., the sales managers from the branch offices of the company throughout the country, and the heads of departments were in attendance.

The company's activity in war work, consisting of the supplying of batteries in large quantities to the Government, to a large degree ceased with the signing of the armistice. This release from war work again places the company's factory on a peace-working basis, so that the battery requirements of varied industries can be cared for.

A Victory banquet, at the Germantown Cricket Club, closed the convention.

New Company Will Specialize in Automobile Credits

CHICAGO, ILL., Feb. 20. — The American Discount Co. has been formed, with a preferred capital stock of $500,000, by a group of Chicago business men, including Walter L. Githens, of the Githens Bros. Co.; Henry Paulman, of H. Paulman & Co.; Niels Buck, of Niels Buck & Co.; Thomas F. Smith, of the Maxfer Truck & Tractor Co., and H. C. Radon, of the investment house of Radon, French & Co.

This company is engaging in the business of discounting commercial paper, acceptances, etc., and will specialize in automobile, truck and tractor credits for manufacturers and dealers.

Good Roads Are a Necessity—Boost !

They're Happy ! But no Wonder—

For they put across the greatest automobile, truck and tractor show Des Moines has ever seen. Staged in the new Ford building, the show had infinite possibilities and full advantage was taken of them. In addition to the passenger cars, eighty-four trucks were shown and the tractor show had twenty-seven tractors of leading makes. The attendance was double that of any previous exhibition in Des Moines and sales went to a new mark in all lines. Interest was so marked in the truck and tractor exhibit that the show photographer lodged formal complaint with the management that he couldn't get pictures of the machines because the people insisted on standing around them all the time, four or five deep. Which pretty nearly tells the tale. From left to right: C. G. Van Vliet, manager; Harter B. Hull, manager truck and tractor department; Dean Schooler, president Des Moines Auto Trade Association.

Coming Events

Shows

March 15 to 22—**Harrisburg, Pa.** Automobile Show in Overland-Harrisburg Co.'s building, 26th & Derry Sts. J. Clyde Myton, Mgr., P. O. Box 361.

March 17-22—**Philadelphia, Pa.** Motor Truck Assn. Show. A. E. Maltby, Mgr.

March 17 to 22—**Columbia, S. C.** Automobile Trade Assn. Show. T. C. Thrower, Mgr.

March 19 to 22—**Trenton, N. J.** Auto Trades Assn. Automobile Show in Armory. John L. Brock, Mgr.

March 19-22—**Norfolk, Neb.** Show by Norfolk Auto Show Assn. Passenger cars, trucks and accessories. A. W. Breyer, chairman.

March 19, 20, 21, 22—**St. Joseph, Mo.** Automobile Show at the Auditorium. Passenger cars, trucks, tractors and accessories. John Albus, Mgr.

March 24 to 29—**Utica, N. Y.** Motor Dealers' Assn. Auto. Show. W. W. Garabrant, Mgr.

March 28, 29, 30—**Peru, Ill.** Illinois Valley Tractor and Automobile Show in building 912-914 Peoria St. Dealers from La Salle and adjoining counties will participate.

April 1-5—**Brooklyn, N. Y.** Motor Vehicle Dealers' Assn. Show. Commercial Cars. I. C. Kirkham, Mgr., 1365 Bedford Ave.

April 5 to 12—**Montreal, Canada.** Victoria Rink, Show, Passenger and Commercial Cars, Motorcycles, Motor Boats, Aeroplanes, Accessories, Tractors and Farm Lighting Outfits. T. C. Kirby, Mgr., Windsor Hotel.

April 8 to 12—**Deadwood, S. D.** Black Hill Auto Show, under auspices of Deadwood Business Club. Tractors will be a prominent feature.

May 10-17—**Bristol, Virginia-Tennessee.** Great Southern Automobile Show, under direction of Chamber of Commerce. Passenger cars, trucks, tractors; ground space for tractor demonstration. C. W. Roberts, Mgr.

Meetings

March 19—**Philadelphia, Pa.** Motor Truck Assn. Meeting. W. H. Metcalf, Sec.

March 19—**Cleveland, Ohio.** Commercial Car Dealers' Assn. Meeting. Geo. K. Wadsworth, Sec., 1316 Woodland Ave.

March 20, 21—**Detroit, Mich.** Automobile Accessories branch of National Hardware Assn. of the U. S. Meeting at Hotel Statler. T. James Fernley, Sec., 505 Arch St., Phila.

March 21—**Philadelphia, Pa.** Automobile Accessories Business Assn. Meeting at Philadelphia Auto Trade Assn. rooms. Albert Stellwag, Sec.

April 10, 11 and 12—**Philadelphia, Pa.** National Association Motor Truck Sales Managers' Meeting.

April 24, 25, 26—**Chicago, Ill.** National Foreign Trades Council; 6th Convention; Congress Hotel. O. K. Davis, Sec., 1 Hanover Sq., New York City.

June 4, 5, 6 and 7—**Hot Springs, Va.** Automotive Equipment Assn., formerly Nat. Assn. Automobile Accessory Jobbers. Meetings.

Personal Items

R. G. Ames has joined the Black & Decker Mfg. Co., Baltimore, Md., as branch manager in charge of the Chicago office of the company. Mr. Ames was formerly associated with the Edw. A. Cassidy Co.

Jos. A. Anglada has resigned as general manager of the Commercial Car Unit Co., Philadelphia, Pa., but will continue as consulting engineer of the company. He will conduct a New York office at 1790 Broadway, a Chicago office at 626 Marquette Bldg., as well as an office in Philadelphia.

John L. Bender has been appointed sales manager of the Anderson Forge & Machine Co., Detroit, Mich.

George Burkle, advertising manager of Gray & Davis, Inc., Boston, Mass., was recently found dead at his desk.

J. J. Buzzell has been appointed advertising manager of the Hyatt Roller Bearing Co., Detroit, Mich. He succeeds W. E. Biggers, who recently resigned that position.

L. B. Casagrande has been promoted to the position of general manager of the Available Truck Co., Chicago, Ill. He has for some time past been in charge of the national distribution of Available trucks.

Cark Changstrom has been appointed western sales manager for the Turnbull Motor Truck & Wagon Co., Defiance, Ohio.

H. W. Clarke has been appointed advertising manager of the Chicago Pneumatic Tool Co., Chicago, Ill.

R. E. Clingan, formerly representative of the Hess-Bright Mfg. Co., has been made sales manager of the Bock Bearing division of the Standard Parts Co., Cleveland, Ohio.

A. E. Creeger has resigned as special traveling representative of the Nash Motors Co., Kenosha, Wis., to join the Ohio Nash company, where he will assume charge of truck sales for that territory.

T. A. Cressey has been appointed sales manager of the Coie Storage Battery Co., Chicago, Ill. He was formerly connected with the Philadelphia Storage Battery Co.

Bruce Daniels, for a number of years connected with the advertising end of the automobile industry, has joined the Russel M. Seeds Co., Indianapolis, Ind.

J. R. Dedell has been appointed advertising manager of the Firestone Tire & Rubber Co., Akron, Ohio.

John H. Diehl has been elected vice-president of the Mason Tire & Rubber Co., Kent, Ohio.

K. P. Drysdale has resigned as advertising manager and director of sales of the Cleveland Tractor Co. He has not as yet disclosed his future plans.

C. L. Falkinburg has been appointed sales representative in middle western territory for the Vorhees Rubber Mfg. Co., Jersey City, N. J.

W. B. Fewell has been appointed sales manager of the Stan-Par axle division of the Standard Parts Co., Cleveland, Ohio.

George C. Gaillard has been appointed New York branch manager of the United States Tire Co. He was formerly special representative of the company in the metropolitan district.

Christian Girl will return to his desk in the offices of the Standard Parts Co., Cleveland, Ohio, in April. Mr. Girl underwent a minor operation in the late fall from which he had not completely recovered when he was threatened with pneumonia. He has been spending some time in the South and has practically regained his normal health.

A. P. Gormully is now organizing an export department for the Ajax Rubber Co. at New York City. During the war Mr. Gormully represented the Fiat Co., of Turin, Italy, at Washington, and also organized the office of the Ajax company in that city.

H. B. Hall, president and general manager of the Chicago Bethlehem Sales Co., distributor of Bethlehem trucks in the Chicago territory, has resigned to become president of the Bethlehem Motors Export Corp., New York City.

William A. Haines, Detroit representative of the Automotive Equipment Department of the Westinghouse Co., East Pittsburgh, Pa., died recently of pneumonia.

Walter P. Hatch, who for the past nine years has had charge of the wire sales division of the Morgan Spring Co., Worcester, Mass., has been appointed district sales manager for the western district and will make his headquarters at Chicago.

R. G. Hayssen, secretary and treasurer of the Sterling Motor Truck Co., was elected president of the company at a recent meeting.

C. F. Hepburn has been appointed director of sales of the Torbensen Axle Co., Cleveland, Ohio. Mr. Hepburn has been serving in the Ordnance Department of the Army for the past year and a half, holding the rank of major.

Gustave Huette, founder of the Falls Motor Corp., Sheboygan Falls, Wis., and for a number of years president of the company, has disposed of his interests in the company and retired from all connection with the concern.

J. M. Hutton has been made sales director of the Republic Truck Co., recently formed to distribute Republic motor trucks from new salesrooms at 735-55 W. Jackson Blvd., Chicago.

Joseph W. Jones, former general manager of the Johns-Manville Co., is now head of the Jones-Metrola, Inc., 29-33 W. 35th St., New York City. This company makes instruments of precision, including the Jones hub odometer.

George J. Kellogg, for eight years secretary and treasurer of the Commerce Motor Car Co., Detroit, died February 2 at Grace Hospital, following an operation.

E. W. Kruste has been appointed district representative for the Standard Motor Truck Co. in Wisconsin and Minnesota territory.

Milner T. LaHatte has been appointed southern division sales manager for the Selden Truck Sales Co., Rochester, N. Y. He will make his headquarters in Atlanta, Ga.

H. K. Lakin, of the firm of Stanley J. Watson, London, England, agent for the Eisemann Magneto Co., Federal Bearings Co., etc., is visiting the United States and is at present located at his New York office, 220 Broadway, Room 714, and at the Woodward Hotel. He will be pleased to communicate with accessories firms desiring representation in England.

Frank Lee, for many years sales manager in Wisconsin and upper Michigan for the Fisk Rubber Co., has resigned his position in order to take a well-earned vacation. He will spend the remainder of the winter and the spring in California.

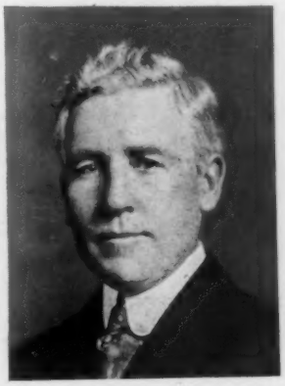
Changes in Non-Gran Personnel

At the annual meeting of the American Bronze Corporation, Berwyn, Pa., held recently, George D. Porter, of Philadelphia, was elected president, succeeding John W. Watson, who severs his active connection with the company to devote his time to a new company bearing his name, the details of which will be announced in the near future. Mr. Watson, however, remains on the board of directors and continues his financial interest in the business.

The active management of the business will continue in the hands of Matthew C. Dittmann, vice-president and general manager.

Edwin G. Anderson, advertising and sales manager, was elected secretary in recognition of his successful efforts in directing sales during the past year. Mr. Anderson has been connected with the company for some years past, originally acting as Pacific Coast representative.

Charles H. Baker, formerly associated with the Timken Roller Bearing Co., Canton, Ohio, was elected assistant secretary and treasurer, and in addition to his financial duties will be in charge of production.



G. W. Burrell
Elected second vice-president of the Wellman-Seaver-Morgan Co., Cleveland, Ohio. He has been associated with the company twenty-one years.

George D. Porter
Who succeeds John W. Watson as president of the American Bronze Corporation, Berwyn, Penna.

Edwin C. Anderson
Who has been elected secretary of the American Bronze Corporation, Berwyn, Penna.

W. M. Jones
Who has been appointed eastern sales representative for the Torbensen Axle Company, Cleveland, Ohio.

Daniel Neil Mason

Daniel Neil Mason, vice-president of the Mason Tire & Rubber Co., Kent, Ohio, died recently at his home in Cleveland of pneumonia. Mr. Mason, who was 31 years old at the time of his death, with his brothers organized the Mason Tire & Rubber Co. in 1915. Since the incorporation of the company he has devoted the greater part of his time to the financial end of the business, as a partner of Mason Brothers Investment Securities Co.

J. W. Lever has been appointed district manager of the Denby Motor Truck Co. His territory includes Oklahoma and Texas.

George McIntyre, until recently general sales manager of the Commonwealth Finance Corp., has become first vice-president of the Metropolitan Credit Corp., of New York, recently organized to finance domestic and export mercantile credits.

J. F. Mackin, formerly connected with the Independent Pneumatic Tool Co., is now representing the Black & Decker Mfg. Co., of Baltimore, Md., in the state of Ohio. He will make his headquarters at Columbus.

Captain Walter J. Munro has been released from service and has joined the General Motors Truck Co. He will be connected with the factory organization at Pontiac, Mich.

George K. O'Donnell has been elected vice-president in charge of sales of the Coe-Stapley Mfg. Corp., New York City.

Robert E. Page, formerly assistant foreign sales manager for Dodge Bros., joined the Commerce Motor Car Co. as district sales manager for Commerce trucks in Canada.

C. O. Miniger has retired as vice-president of the Willys-Overland Co. to devote his entire attention to the management of the Autolite Corp., Toledo, Ohio, of which he is president and general manager.

Edwin H. Paris, for a number of years connected with E. O. Hall & Son, Ltd., has accepted the management and control of the Schuman Carriage Co., Honolulu. This company deals in automobiles and supplies.

Glenn T. Purdy has returned from active service overseas and has rejoined the King Motor Car Co., Detroit, Mich., as purchasing agent.

Edward Quinn has severed his connection with the Ajax Rubber Co., Inc., New York City, to join H. P. Baran in organizing the Truck Tire Service Co., 204 9th St., Brooklyn, N. Y.

G. M. Rymarczick, until recently supervising senior inspector of the magneto section of the Bureau of Aircraft Production, is now connected with the Simms Magneto Co., East Orange, N. J., in the capacity of production engineer.

Samuel E. Ryder is now affiliated with the Detroit branch of the Moto Meter Co., Inc., of Long Island City, N. Y. All correspondence to manufacturers of passenger cars, trucks and tractors is now handled from the Detroit branch.

Leo M. Rumely was made vice-president of the Parrett Tractor Co., Chicago, Ill., at a recent meeting of the board of directors. Mr. Rumely will supervise the sales and advertising of the company.

A. E. Schaefer has been made general sales manager of the Gramm-Bernstein Motor Truck Co., Lima, Ohio. He was formerly associated with the Sherwin-Williams Paint & Varnish Co.

A. H. Schiappacassee, for the past six years connected with the engineering and service department of Dodge Bros., has resigned to become assistant manager and research engineer for the Brisk-Blast company, Monroe, Mich.

E. L. Sloan, district sales manager of the Reo Motor Car Co., Lansing, Mich., and identified with that company for ten years, has accepted a similar position with the Mitchell Motors Co., Inc., Racine, Wis.

W. W. Smith has been appointed assistant sales manager of the Nash Motors Co., Kenosha, Wis.

Clifford M. Snow, who has been southern division sales manager for the Selden Truck Sales Co., Rochester, N. Y., has been appointed special field supervisor for the company. He will make his headquarters at San Francisco.

L. J. Stevenson has been made district sales manager for the Commerce Motor Truck Co., Detroit, Mich., with headquarters at Buffalo, N. Y.

C. M. Strieby, former advertising manager of the Smith Motor Truck Corp., has been appointed advertising manager of the Fulton Motor Truck Co., Farmingdale, L. I.

H. H. Southgate has been appointed advertising manager of the United States Motor Truck Co., Covington, Ky. He is also in charge of the motor transport division which has recently been established.

Loyal E. Thompson has been appointed assistant manager of the service department of the Republic Motor Truck Co., Inc., Alma, Mich. Mr. Thompson was formerly connected with the service department of the Cadillac Motor Car Co.

C. F. Troupe, representative in the East and South for the Fisk Rubber Co., Chicopee Falls, Mass., has been appointed Milwaukee branch manager.

A. B. Warren was recently elected president of the Maccar Truck Co., Scranton, Pa., at a special meeting of the stockholders of the company.

Christy Walsh has returned to the Maxwell Motor Sales Corp., Detroit, as director of Maxwell and Chalmers publicity.

Lieutenant-Colonel W. G. Wall has returned to the National Motor Car Co., Indianapolis, Ind., in his former capacity of chief engineer. During the war he was connected with the Ordnance Department.

W. A. Murfey

Of the King Trailer Company, Ann Arbor, Mich., who has been elected first vice-president of the Trailer Manufacturers' Association.

Birkett L. Williams has been appointed sales manager of the truck department of the Grant Motor Car Corp., Detroit, Mich.

B. W. Burtsell

New president and general manager of the Herschell-Spillman Co., North Tonawanda, N. Y.

T. C. Perkins

Who has been made treasurer of the Herschell-Spillman Company, North Tonawanda, N. Y.

Alwin A. Gloetzner

Who has recently been elected vice-president of the Covert Gear Company, Inc., Detroit, Mich.

J. A. Barnett

Who has been made assistant branch manager at New York for the Bearings Service Co.

Removals and Trade Changes

Gates Rubber Co., Denver, Col., has changed the name of its product to the Gates Vulco Tube Patch.

Hawthorne Mfg. Co., Inc., Bridgeport, Conn., maker of headlights, spotlights, etc., has been consolidated with Hamilton & De Loss, Inc. The new company will be known as the Hawthorne Co. and will occupy the recently completed buildings of the Hamilton & DeLoss plant. The officers of the company are E. W. Bassick, chairman of the board; H. H. DeLoss, president; H. H. Hamilton and E. A. Hawthorne, vice-presidents; H. H. DeLoss, treasurer; Arthur D. Sullivan, assistant treasurer; E. Horace Hawthorne, secretary.

General Ordnance Co., Derby, Conn., which during the war manufactured shells, has changed its name to the National Tractor Co., and plans to enter the tractor field on a large scale.

Hartford Auto Parts Co. and the Kinsler-Bennett Co., both of Hartford, Conn., have been consolidated under the name of the Hartford Automobile Parts Co., with a capital of $1,500,000. The plant formerly occupied by the Billings & Spencer Co. has been taken over to provide additional facilities for the manufacture of universal joints and drives. Hollister, White & Co., bankers, of Boston, Mass., have taken a substantial financial interest in the company. James M. Carney, formerly of the Hartford Auto Parts Co., becomes chairman of the board of the new company; J. McA. Johnson, president; F. R. Switzer, vice-president; H. A. Bigelow, treasurer, and T. C. Hudson, assistant treasurer. The directors include the above and H. A. Allen, of the City Bank & Trust Co., and Shires Morris, president of Hart & Hegeman Co.

Seymour Mfg. Co., Seymour, Conn., manufacturer of brass castings, has taken over 1500 shares of the stock of the Eisemann Magneto Co., of Brooklyn, 500 shares being retained by R. Kny, president of the Eisemann company.

Diamond Holfast Rubber Co., formerly Diamond Holfast Patch Co., Atlanta, Ga., announces that the company has recently been reorganized to manufacture a complete line of rubber goods, including automobile accessories, inner tubes, etc. The company has a paid-in stock of $100,000 which will be increased to $2,500,000.

Morse Chain Co., Ithaca, N. Y., announces that the Kansas City offices of the Morse Engineering Co., their western representative, have been removed from the R. A. Long Bldg. to Suite 211-212, Finance Bldg. W. V. Warner is in charge.

Kentucky Wagon Mfg. Co., Louisville, Ky., announces the purchase of the Dixie Motor Car Co. This purchase gives the Kentucky Wagon Mfg. Co. a complete line of passenger cars and trucks, as it has for some years been making Old Hickory motor trucks. Robert V. Board, president of the company, was also president of the Dixie Motor Car Co.

Hammered Piston Ring Co. of America has been taken over by the Bartlett-Hayward Co., of Baltimore, a concern which was engaged in the making of munitions during the war. The plant of the former company is located at Newark, N. J., and will be kept in operation, the overflow being handled by the Bartlett-Hayward Co.'s Baltimore plant.

Western Carburetor Co., Alma, Mich., has been reorganized and will resume operations in the near future. The capital stock of the company is $120,000. Henry Prescott has been made superintendent and sales manager of the company.

Wilson Foundry & Machine Co., Pontiac, Mich., has purchased the plant of the Monroe Motors Co. at Pontiac and will use the buildings for the manufacture of complete motors for the Moline Tractor Co., of Moline, Ill.

Ever Tight Piston Ring Co., St. Louis, Mo., announces that it has removed to larger quarters at 3124 Locust St. This company was formerly located at 1600 Kingsland Ave.

Edison Storage Battery Co., Orange, N. J., announces the removal of its New York sales office from 209 W. 76th St. to 247-51 W. 35th St., New York City.

Braender Rubber & Tire Co., Rutherford, N. J., announces the removal of its export department to 32 Broadway, New York City. Until May 1 the address of the export department will be 315 Fourth Ave., New York City.

Hession Tiller & Tractor Corp., Buffalo, N. Y., has changed the name of its four-wheel farm and road tractor from Hession to Wheat tractor. The tractor will bear on radiator, tank and fenders, a trade mark and emblem symbolic of the new name.

Coe-Stapley Mfg. Corp., New York City, announces that the offices of the company have recently been moved from 135 Broadway to 136 Liberty St.

"E-Z-Way" Demountable Wheel Co., 380-84 Canal St., New York City, announces that it has taken over all assets and property formerly owned by the J. P. Gorman Co., Inc.

Ackerman Wheel Co., Cleveland, O., announces that the company will be known in the future as the Atlas Wheel Co.

Standard Parts Co., Cleveland, O., announces that it is now located in the new Standard Parts Bldg., Walnut Ave. at E. 11th St. The central office organization includes the executive and supervisory staff, credits, collections, disbursements, advertising and contracting for the larger material supplies. The sales, engineering, production, cost and purchasing offices will be located at the several plants.

Gaul, Derr & Shearer Co., 217 N. Broad St., Philadelphia, Pa., announces that it has discontinued its retail department and its business is now on an exclusively wholesale basis.

Lavine Gear Co. announces that the Racine plant of the company has been closed, the Milwaukee plant on Keefe Ave. being now the only one in operation.

Factory News and Capital Increases

American Manganese Steel Co. is constructing a foundry and accessory plant at Oakland, Cal., to handle its business on the Pacific Coast.

Ahlberg Bearing Co., Chicago, Ill., has broken ground for the erection of a new factory at 29th St. and Calumet Ave. It will be two stories high and constructed of steel and reinforced concrete. It will cover a floor space of about 20,000 sq. ft. It is expected that the new plant will be ready for occupancy in the latter part of February.

Master Trucks, Inc., Chicago, Ill., is planning to increase the facilities of its plant by the addition of an assembly unit, which will enable the company to turn out 20 trucks daily. An option was taken on the plant during the war, and the work of equipping it for progressive assembly was undertaken upon the signing of the armistice.

Pierce Governor Co., Anderson, Ind., has recently completed a two-story brick addition to its plant. The new building will be used for storing raw material and finished parts, and the tool-making and pattern-making departments will be moved into it. This addition covers 5000 sq. ft. of floor space.

Commerce Motor Car Co., Detroit, Mich., has prepared plans for an addition to its factory at Mackie and Solvay Sts. With the new addition the Commerce company will have over 100,000 sq. ft. of floor space for manufacturing purposes.

Lauraine Magneto Co., Menominee, Mich., has recently purchased 50,000 ft. of factory space at Long Island City, New York, and will begin production there as soon as the machinery can be transferred from Menominee. Michel Feldine, president of the company, states that 50,000 magnetos will be produced during the coming year.

Napoleon Motors Co., Traverse City, Mich., announces that it has increased its capital stock to $500,000.

National Tire & Rubber Co., East Palestine, Ohio, expects soon to complete the large factory addition now under construction. This addition to its plant will enable the company to greatly increase its production. Two new tires are to be placed on the market by the company. They will be distributed exclusively through jobbers.

Climber Motor Corp., Poteau, Okla., has purchased a 20-acre factory site in Little Rock, Ark., and will shortly begin the erection of the first unit of its factory. This building will be 300 by 400 ft. Production will start in about 60 days, and the company plans to manufacture 3000 cars during 1919.

New Agencies

The Triangle Motors Co., Bloomington, Ill., has taken the agency for the Service truck and will have five central Illinois counties for territory.

M. W. Ulfers, Freeport, Ill., has taken the agency for the Acme motor truck and will have charge of the Stephenson county territory.

Elbert S. Hatcher Co., Springfield, Ill., has been organized and opened a truck agency at 207-209 Washington St. The company will distribute the Republic truck. Mr. Hatcher was formerly service manager for the Ford branch at St. Louis, but of late years has been manager of the Jennings Auto Sales Co., of Springfield.

Hanson & Tyler Co., Fort Dodge, Iowa, will distribute Dart trucks and Blue J tractors for the Dart Truck & Tractor Corp. in western Iowa and South Dakota.

C. S. Ransom, Inc., Boston, Mass., has been appointed New England distributor of Sanford trucks by the Sanford Motor Truck Co., Syracuse, N. Y.

Nash Saginaw Motors Co. has been formed at Saginaw, Mich., to distribute Nash cars and trucks. R. P. Bishop resigned as assistant sales manager of the Nash company to organize the new agency. L. A. Wilson, also connected with the Nash company, is associated with Mr. Bishop in the new enterprise.

B. J. McMullen will distribute Republic trucks in Minneapolis. He was formerly manager of the Chevrolet Motor Co.

Judson M. Sells will distribute Commerce trucks in the Buffalo territory.

Corbitt Motor Sales Co., 1792 Broadway, New York City, has been appointed New York dealer by the Corbitt Motor Truck Co., Henderson, N. C.

EFFICIENT REPAIR METHODS

Editor's Note: This department is conducted primarily for the new repairman and dealer; also the repairman in the smaller towns who is anxious to place his shop on a better paying basis and do his work in a more systematic manner. We shall appreciate any suggestions or criticism that will help us make this department satisfy your needs.

Overhauling Clutch and Rear Axle of Types 20 and 21 Vim Chassis and Restoration of Worn Parts

By C. P. SHATTUCK

THE following method of removing, overhauling and replacing the clutch used in the Vim trucks, types 20 and 21, is employed at the New York factory service station, of which E. S. Pritchard is manager. Throughout the discussion use will be made of the **name of the part as listed in the parts book of the Vim Motor Truck Co.** This explanation is made for the benefit of those repair shops not specializing in Vim truck repairing, and who may undertake, for the first time, the overhaul of a unit. The suggestion is also made that a study be made of the accompanying illustrations, showing the **unit disassembled and with the parts arranged in the order of disassembly.** This should conserve time in the reassembly, particularly when one is not familiar with the unit.

Note.—Right and left of the truck is designated from the driver's position as he sits in the seat. The driver sits on the left-hand side and faces the front of the truck.

Removing Floorboards

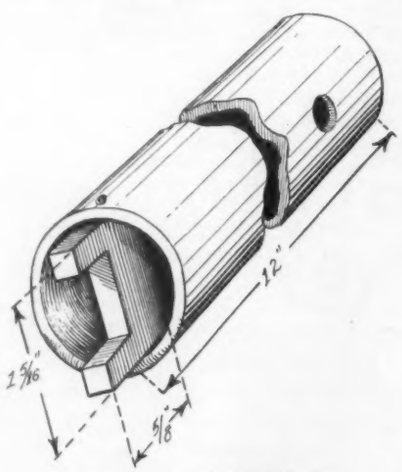
Remove floorboards and nuts and bolts, two in toeboard on each side. Take out two 5-16-in. stove bolts in steering column base, using screw driver and wrench.

Remove Toeboard (left): Loosen steering bracket on column, it is in two sections. **Disconnect V-block on service brake.** Push brake pedal forward and slip out brake rod. Both pedals should now be free.

Note: In taking out throw bar of clutch pedal, release clutch.

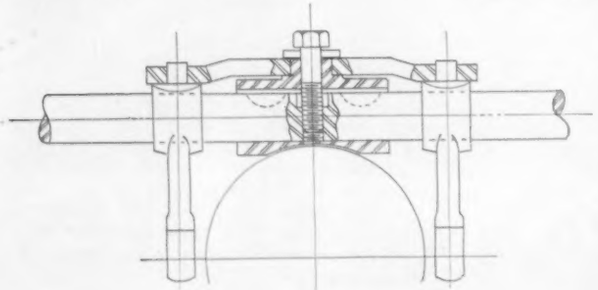
Take out the six universal joint flange nuts and bolts in the front universal. First, jack up rear wheel and turn it so that propeller shaft may be turned. Remove two nuts and bolts, then turn shaft and take out next two. Then turn the shaft and take out the last two nuts and bolts, which will then allow the front end of the propeller shaft to drop to the ground.

Take out the cotter pin and clevis pin in the clevis of the emergency brake rod where it joins the emergency brake hand-lever. This will allow the emergency brake pull-rod to drop to the ground. Remove the cap screw which fastens the equalizing bar to the clutch throw-out shaft and also holds in position the levers for shifting the clutch on the clutch release shaft. Upon removal of this equalizer bar, the levers for shifting the clutch may be moved apart on the clutch throw-out shaft.



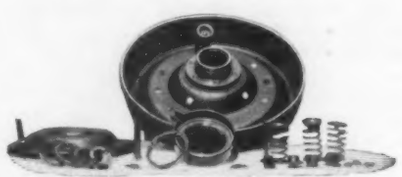
Crankshaft Lock Nut Wrench

The U-shaped piece is made of self-hardening steel and to a drive fit in tube. The former is, of course, tempered.



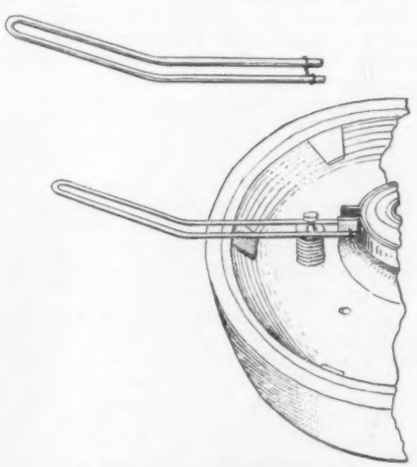
New Vim Clutch Throw-Out Assembly

This construction will be found on the new models. The collar is keyed to the equalizer bar and takes all the strain which in the former models is put on the cap screw.



The Vim Clutch Disassembled

Loosen the two cap screws which fasten the bracket on top of the flywheel housing, which bracket carries the accelerator linkage, so that transmission housing will clear when removal of it is started. **Remove transmission bolts** (six 3/8-in. cap screws) holding housing to flywheel housing, using 3/8-in. straight socket wrench. Step inside the frame, facing engine, and **loosen transmission** housing from flywheel housing by rocking. It is held in place by two dowel pins. Use the blade of screwdriver to



Clutch Spring Replacing Tool

Used in similar manner to valve spring compressor, the wired end being placed under extension of throwout bearing retainer. A small block of wood is placed under spring stud when compressing spring.

start the clutch housing to break loose from the flywheel housing, then by a slight rocking motion the clutch housing and transmission complete should slip off the shaft and lift out easily.

Removing Clutch

The Vim clutch is of the leather-face cone type, with spring inserts underneath the leather, set in the bell housing at the rear of the engine. The leather facing on the clutch cone comes into contact with the metal of the flywheel and provides a smooth engagement and positive release. Small springs are inserted under the leather on the cone facing to raise the leather at several points, which reduces the friction area, thereby insuring a gradual engagement. Four strong steel springs hold the clutch in engagement when the truck is in motion. To remove the clutch assembly as a whole, it will be necessary to lock the flywheel to prevent it turning when pressure is applied to the nut on the end of the crankshaft. This nut is called the clutch thrust bearing nut.

Taking it that the flywheel has now been held rigged to remove the clutch thrust bearing nut, one will require a special straight socket wrench, an illustration and dimensions of which are shown in an accompanying sketch. This nut has a right-hand thread, therefore it will be necessary to turn to the left for the release of this nut. After the clutch thrust bearing nut has been removed, the whole clutch assembly may then be removed from the flywheel, as shown in the illustration.

If it is required to remove the clutch only, and not the unit, with the hub attached, this may be accomplished in the following manner: By depressing on the cup on each of the four small clutch springs and removing the "U" washer. The clutch can then be slipped off the shaft.

Disassembling Clutch

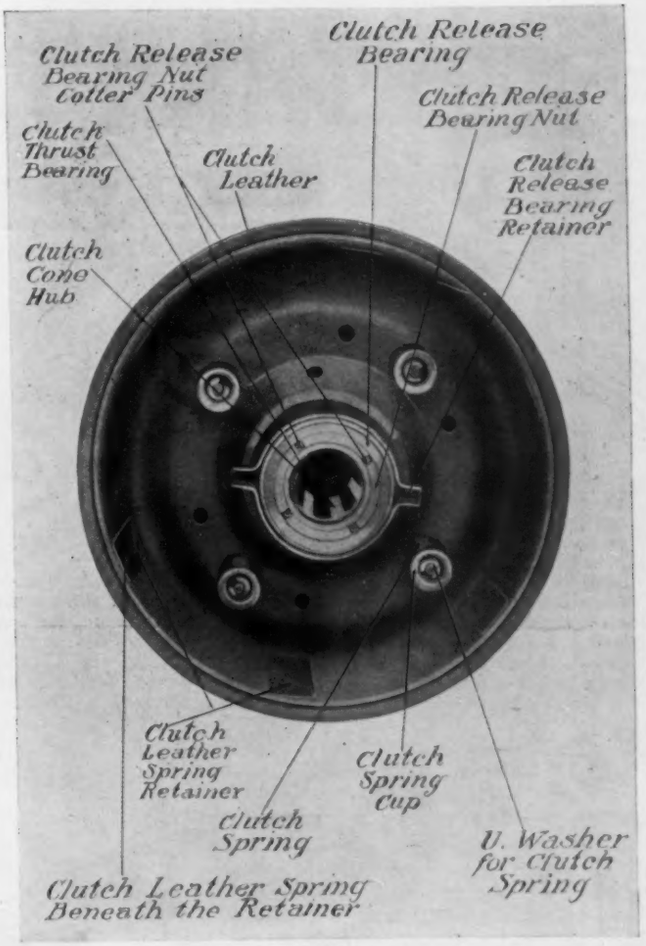
With the clutch laid flat on the bench with the spring end up, remove the four cotter pins in the slots of the throwout bearing lock nut. Unscrew and **remove throwout bearing lock nut,** using a blunt chisel or special wrench. **Remove clutch throwout bearing retainer and bearing.** The assembly of these springs is similar to the conventional valve spring. By pressing down on the spring cups, as to clear the stud, the "U" washer can be removed when spring is compressed. **Remove clutch springs and assembly, clutch spring plate, thrust bearing, cone and retainer.**

Note: A test should be made for play, due to wear, of the clutch throwout bearing lock nut. If this be badly worn or thin, it should be replaced with a new one, else its shoulder will become so thin that the clutch will not fully release.

When Clutch Action is Harsh

To remove and replace the six clutch face springs, between the clutch facing and cone, use a pair of round nose pliers and the tool shown in the accompanying illustration. This tool is a long awl, constructed by grinding down the blade of a small screwdriver to a blunt point. Insert blade of screwdriver between facing and cone, on either side of spring, and with the awl start spring, then use pliers. Replace with new springs whenever necessary, as sometimes the spring tension becomes weak after the springs have been used for a considerable length of time.

Clutch Face Spring Tool Made From a Long Awl or Old Screw-Driver.



End View of the Vim Clutch.

In the service station mentioned use is made of a hacksaw blade for roughening the surface of the facing. A better method would be to treat the facing in the conventional manner, cleaning it and using Neatsfoot oil when the action is harsh, or when a new facing is applied. The Vim clutch facing is leather, riveted to the cone, and its replacement with the new follows conventional practice.

Reassembling Clutch

To reassemble clutch components, reverse the order described, lubricating the parts subject to friction, these including the thrust bearing, clutch throwout, etc. A handy tool for compressing the clutch springs when replacing the "U" washers or locking members, is shown in an accompanying illustration. It is constructed of a 5-16-in. round stock bent to a U-shape, and with a slight angle. The open end of tool is wired.

Note: In replacing the cotter pins in the throwout bearing lock nut, their ends must be bent back flush with the ring, else they will interfere with the action of the clutch. This is important.

In reassembling the clutch with the clutch throwout bearing, care must be taken that the clutch throwout bearing retainer is screwed all the way up to the shoulder **without binding on the clutch throwout bearing,** and then locked with the four cotter pins.

Best Sales in History at the Albany Show

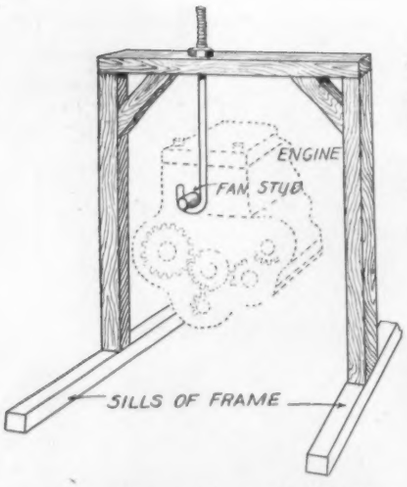
ALBANY, N. Y.—February 23.—Albany's ninth annual automobile show closed February 22, and the verdict of dealers exhibiting, as well as of the officers of the Albany Automobile Dealers' Association, under whose auspices the show was held, pronounced it the best show in the history of the association.

Figures given by J. B. Wood, secretary and treasurer of the association, showed that 17,000 attended the show. Mr. Wood estimated the twenty-five truck exhibits at $50,000.

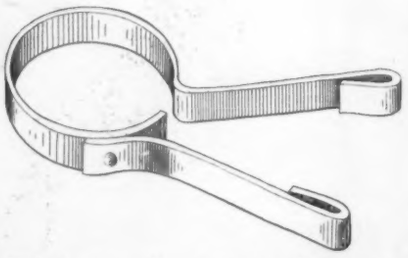
Much of the success of the show was due to the novel means of advertising employed, in the opinion of W. A. Carpenter, president.

One of the most successful points of the show, from the dealers' viewpoint, was the increase in the large number of prospective purchases, as well as an increase in sales.

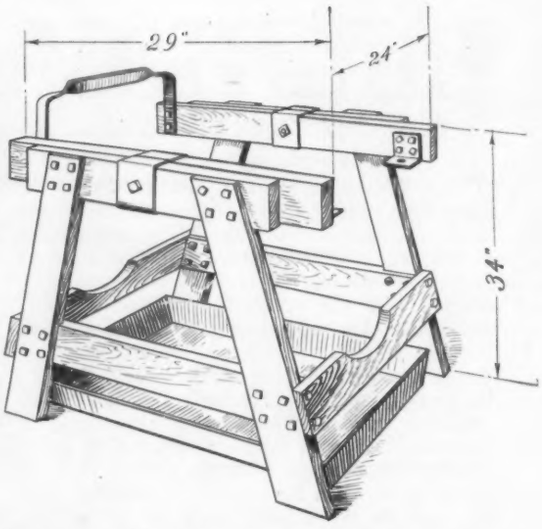
Helpful Suggestions for the Repairman



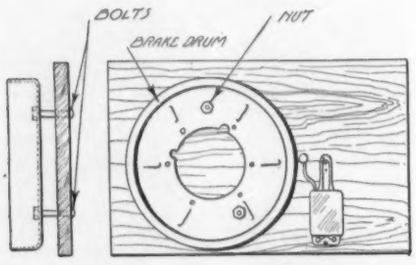
The engine used with types 20 and 21 Vim cars is secured at front by what is termed an engine-base front collar, held by two bolts. In working on timing gears and with engine in frame the removal of collar and timing gear case eliminates the support, consequently use is made of the fan stud in cylinder block. A simple frame work is placed on the sills and a threaded rod with lock nut and a hook is used to support the weight of the engine as illustrated.



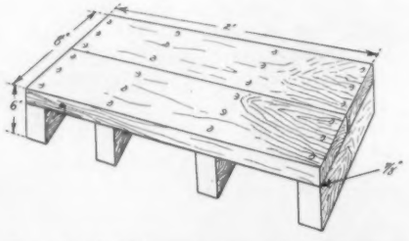
This piston ring clamp is constructed of 1½ x ⅛ in. sheet metal, and is made of two sections. One part is bent to almost a complete circle and includes the handle. The other section is rivetted to the circular part. Compressing the handles exerts pressure practically on the entire ring. Contributed by Wm. Kershaw, New York City.



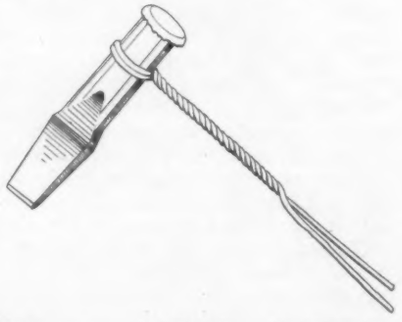
Engine stand of revolving type used in service station of Vim Motor Truck Company, New York City. It is constructed of 5½ x 1¾ in. stock, and the revolving section has L-shaped irons with ¾ in. hole for bolting arms of engine. The front of engine is supported by an iron, 2⅜ x 3/16 in. stock, and it has a 1⅛ in. hole, 9 in. from end, which takes the fan stud that forms the third support of engine in stand. Revolving member is prevented from turning by a pin passing through it and the frame.



Instead of utilizing a bell for signalling foremen, workmen, etc., a service station manager bolted a brake drum to a board, leaving a space between drum and board. An electric bell, minus the signal, was so mounted that hammer contacts with drum.



Instead of jacking up the rear or front axle when work is to be done under the car the use of a couple of wood stands, 2 ft. long and 6 in. or more high, will be found useful and safer than ordinary jacks.

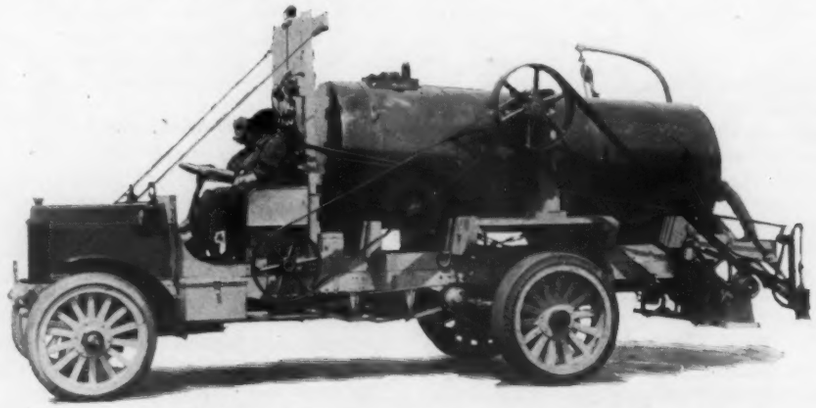


Easily constructed holder for cold chisel when sledge is used. Is made of heavy wire twisted around chisel and further twisted to make a handle. Contributed by Wm. Kershaw, New York City.

Novel Truck Used on California Bean Ranches

As it is necessary to keep the dust off growing beans, the big Sells ranch in the Sacramento Valley, California, has had special equipment built for doing this work. The special equipment consists of a 1200-gal. tank, in which water is carried for sprinkling the many miles of road on the ranch. The outfit includes a pump, having a capacity of 300 gal. per minute. The water is pumped from irrigating ditches, anywhere on the ranch, into the tank. The pump is run from a power take-off on the transmission countershaft, and the same connection also furnishes power for any other farm machinery.

The tank and pump unit may be removed at will, and a platform body installed for general hauling. A 7-ft. headboard is mounted in the rear of the driver's seat, and this has a telescoping mast for loading hay on the machine. This rigging is permanently fastened to the chassis, due to the fact that much livestock gets into the irrigating ditches on the ranch, making it necessary to lift out the cows. With this equipment the work of rescuing the animals is hastened and made easier. Power for the mast is derived from a winch inside the power shaft, alongside of the operator's seat. A coupling device on the truck permits the attaching of trailers.



Peerless Truck Equipped With Twelve Hundred Gallon Water Tank
This outfit is used for sprinkling the roads on the bean ranch, so as to keep the dust from getting on the beans

NEW COMMERCIAL CARS

Republic Post-War Models in Detail

THE two new Republic models, the "Invincible" and the "Dreadnaught," which were displayed for the first time at the Chicago show, are now ready for delivery. They embody all that is new and desirable in truck construction, and are striking examples of the progress that has been made in motor truck design during the war period.

Model 19, the "Yellow Chassis Invincible," is the Republic company's latest offering of 2-2½-tons capacity, and is the ideal size for hundreds of purposes.

Model 20, known as the "Yellow Chassis Dreadnaught," has been designed to fill the need for a moderately lightweight truck capable of performing strenuous heavy-duty work. Its rated carrying capacity is three and one-half tons.

Both new models are of generous proportions and are perfectly balanced. The standard wheelbase of the "Invincible" is 144 in. and that of the "Dreadnaught" 165 in. The "Dreadnaught" is also furnished with a 185-in. wheelbase at an additional charge. The engines of both trucks are Continental Red Seal. The smaller model is a four-cylinder, 4⅛ x 5¼ in., rated at 28.88 hp., while the three and one-half ton model uses a four-cylinder, 4½ x 5½ in.

Special alloy steels have been used extensively throughout on these new models, from the pressed steel frame to oil pump driving shaft and gear, with different specifications and strength, adapted to the different work.

Large Radiator Capacity

Important refinements in radiation are noted in these models. The exclusive Republic armored type radiator has been increased in size, giving a frontal area of 450 sq. in. on the "Invincible" and 600 sq. in. on the "Dreadnaught." The core is removable and built with the excess strength to withstand vibration and road shocks, and with sufficient capacity to properly cool the engine in any climate.

The four-speed transmission is an important factor in the moving of heavy loads as it provides for a wider application of engine power. The extra low gear furnishes greater tractive effort, thus giving the trucks remarkable ability in overcoming bad road conditions and in starting with heavy loads. Moreover, this transmission provides speedy intermediate for use on long grades where there is a medium uphill pull. The fourth speed provides an economical direct drive for ordinary running.

From the engine, the drive is a multiple dry disc clutch, to the four-speed gear box, located in unit with the engine, and then by propeller shaft to the rear axle. The two-piece propeller shaft, tapered at both ends, is supported at the center by a self-aligning bearing; three universal joints insure easy and free power application. As in all other Republic models, these new trucks feature Torbensen internal gear drive rear axle.

Ignition is by a high tension magneto, with variable spark operated by hand lever on steering wheel. Carburetion is through a special float-feed carburetor.

The speed of the engine, and thus the speed of the truck itself, is limited by means of an oil governor driven by helical gears from the inlet camshaft.

Springs are semi-elliptic front and rear with full Hotchkiss drive. The rear spring suspension has been constructed to conform to government design. A new type external service brake mounted directly in front of the rear axle (illustrated in our last issue), a foot accelerator with foot plate, a front and rear axle wrench, and a wrench to fit spring clip nuts are items of particular interest. The new models are also supplied with either the solid or cord pneumatics.

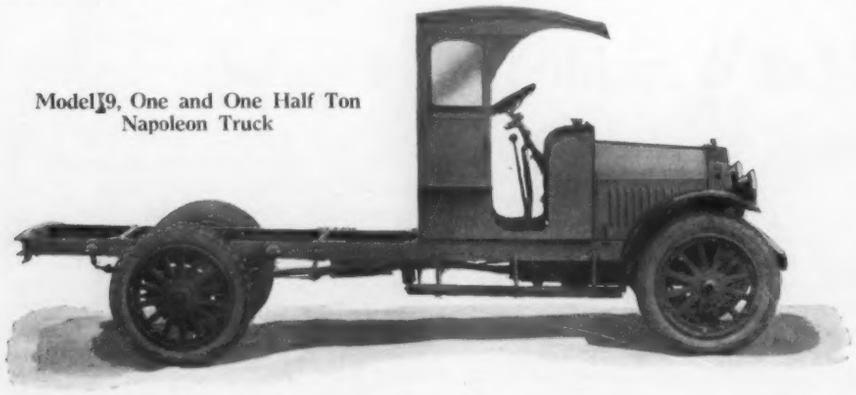
Model 20, Republic Truck

Model 19, Republic Truck

Napoleon Motor Truck Built in Two Sizes

The Napoleon Motors Company, of Traverse City, Mich., is concentrating its efforts on two models this year, viz., 2000-lb. chassis, listing at $1285, and a 3000-lb. chassis, at $1485. This company has asked permission of the Michigan Securities Commission to sell the remaining $350,000 worth of the unsubscribed common stock of the company, for the express purpose of increasing its production schedule, to meet the present demands for its models.

As the two models differ very little in the general make-up, only the specifications of the 1-ton model will be given.



Model 9, One and One Half Ton Napoleon Truck

The engine is a Gray Victory Model, four cylinders, 3½-in. bore, 5-in. stroke, rated at 35 hp.; cooling is by thermo-syphon system; radiator is of tubular type, built by the Chicago Mfg. Co.; Stromberg 1-in., Model M 1 carburetor; Connecticut ignition system; Auto-Lite engine starter, when specified; Fuller disc-type clutch, and Fuller TU ¾ transmission, three-speed; Detroit universal; Hotchkiss drive; Clark Model A-S, rear axle; 6 to 1 gear ratio; wheelbase, 132 in.; one-half elliptic springs; tires, solid, 32 x 3½ in. front, 32 x 4 in. rear; Lavine steering gear; hand and foot brakes are external contracting; governor as specified; 65 per cent. total weight on rear axle; chassis weight, 3400 lb.

The specifications of the Model 11, 3000-lb. capacity truck are the same as for the Model 9, with the following exceptions: Clark Model 1, rear axle, with 7 to 1 reduction; pneumatic tires, 35 x 5 in., all around, and chassis weight 3450 lb.

New Gramm-Bernstein Has Three-in-One Body

Freed from war contracts, the Gramm-Bernstein Co., of Lima, Ohio, is now preparing to push its complete line, but especial attention is being given to the new one-and-one-half-ton job which has recently been announced.

In addition to being extra sized for its rated capacity in practically all of its vital parts, the new truck has a novelty in a three-in-one body, which gives the truck owner the combination benefit of a flare-board express body, a high slatted body, and a tarpaulin-covered body.

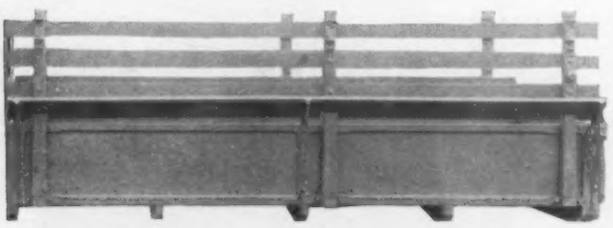
Through the flare-boards of the express body, provision is made for the insertion of stakes carrying the slatted sides, and these stakes in turn may be fitted with the irons which support the tarpaulin cover. This three-in-one body will appeal particularly to the farmer and to the one-truck man who must make his truck do a variety of work. Two other types of body are furnished with the complete truck—platform stake and slatted stake, each in high, medium or low styles.

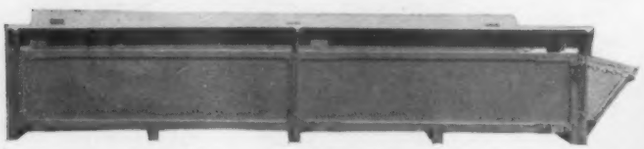
The new model is powered with a Continental, 3¾ x 5 Red Seal "N" engine. The rear axle is a Clark (Celfor), and is really of greater capacity than is usually employed in a 1-ton job. The bearings in particular are as large as those usually specified for a truck of much higher rating.

The springs are extra heavy, and are made of vanadium alloy. The radiator is the Gramm-Bernstein cast type, and cushioned to the frame by springs.

The Northeast electric system is used and the horn is electrically operated. The propeller shaft is in two pieces, with three universal joints. Both brakes act on the rear wheels.

While this new one-and-one-half-ton truck is to be featured, the heavy-duty, worm-drive models made in 2-, 2½-, 3½- and 5-ton capacity, will be continued as in the past.



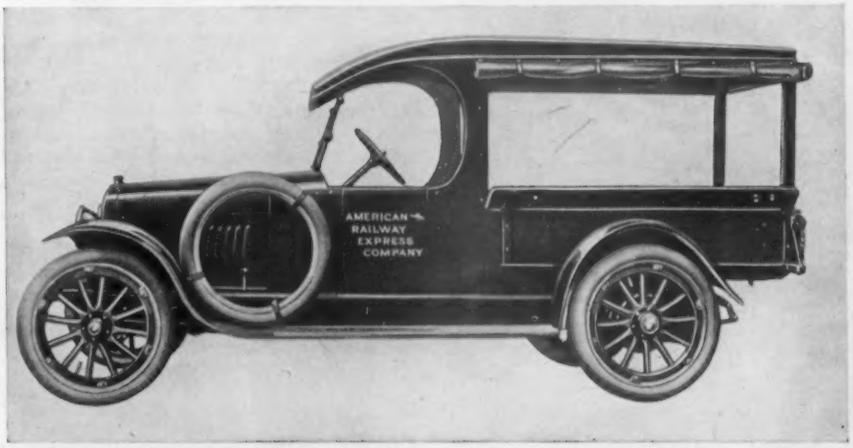


The New Three-in-One Truck Body Gives the Owner the Benefit of a Flareboard Express Body, a High Slatted Body and a Tarpaulin-Covered Body.

Maibohm Six-Cylinder Business Car at $1200

A six-cylinder, half-ton business car is announced by the Maibohm Motors Company, Racine, Wis. The car is priced at $1290.

The engine is a valve-in-head, six-cylinder Falls, with Wyman-Gordon counterbalanced crankshaft. The bore is 3⅛ in., and the stroke 4¼ in. It is rated at 23.44 hp., and develops 46 hp. at 2290 r.p.m.



The Delivery Body, With Full Doors Enclosing the Driver's Compartment, is Standard Equipment on the New Maibohm Business Car

Lubrication is by cam-operated piston pump, and by splash from constant level troughs to the cylinders. Cooling is thermo-syphon, with a Perfex radiator.

The carburetor is a Stromberg L. B. model, with economizer, controlled by foot and hand throttles. Fuel supply from a 14-gal. rectangular tank in the rear, and a Stewart vacuum system. Atwater-Kent ignition, with manual advance is used, the distributor being mounted according to S. A. E. standard on left rear deck of crankcase, and driven from camshaft in an independent unit. Starting and lighting is by Wagner 6-volt, two-unit system, with Bendix drive starter and generator driven through helical gears in the front gear case. Both are mounted according to S. A. E. standards.

A Willard 6-volt battery is carried in a steel cradle under the front floor boards. The clutch is Borg & Beck. Transmission is Mechanics selective, with three speeds forward and one reverse, in unit with the power plant. Control levers are overhung from the transmission case within easy reach of the natural driving position. Drive is Hotchkiss, with two 4-in. universal joints and seamless steel tubular propeller shaft.

Brakes are internal and external, on 12-in. rear wheel drums, 2 in. in diameter, Thermoid lined. The muffler is a Maxim silencer. Steering gear is Jacox, irreversible split-nut type, with simple adjustment. A 17-in. notched-grip hand-wheel carries the spark and gas quadrant, and the horn button.

The front axle is a drop-forged I-beam section, and the rear axle is full-floating, with a four-pinion Brown-Lipe-Chapin differential. The high gear ratio is 4.5:1; second, 7.875:1; low, 13.68:1.

Springs are semi-elliptic, underslung; front, 36 in.; rear, 49 in. Wheels are artillery type, with twelve spokes front and rear, natural wood finish. Stanweld rims are used, and 32 x 3½-in. side tires, non-skid rear.

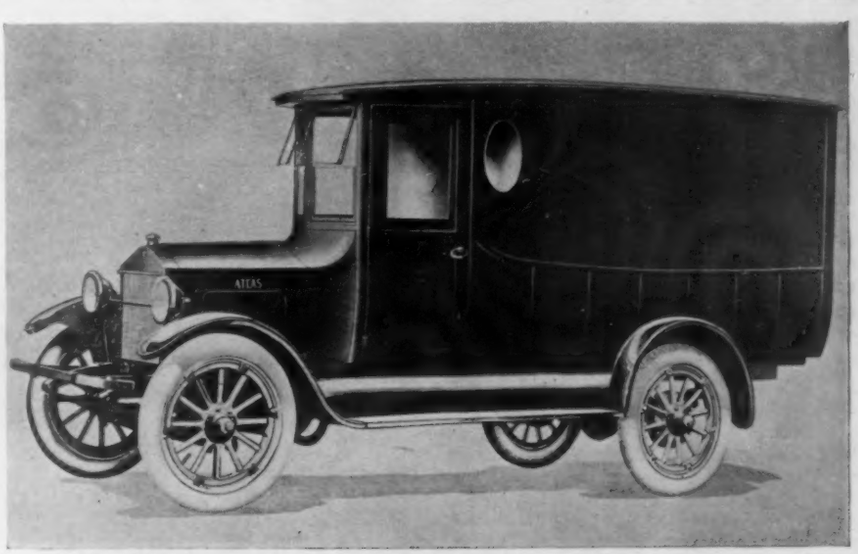
The wheelbase is 116 in., and the road clearance at lowest point is 10½ in. The car weighs 2420 lb. Loading space is 6 ft. long, 4 ft. high and 3½ ft. wide. The rated capacity is 1000 lb.

An attractive delivery body, with full doors enclosing the driver's compartment, is standard equipment. It is built in the Maibohm factory, of seasoned ash and maple, well braced and steel reinforced throughout. Flare boards and tail gate are edged with steel, and the floor is protected by steel plates.

The roof is natural wood finish, covered with heavy weather-proofed duck, and the supporting posts are built into the body bed. Heavy curtains, completely enclosing the driver's compartment, and the loading space, are standard equipment. Extra seats, either cross or lengthwise, may be provided for passenger or station wagon purposes, or for the carrying of workmen and their equipment. Wire screens, side and rear, or solid side panels and full rear doors are furnished on special order. The car is designed to deliver 20 miles per gasoline gallon and 9000 miles per set of tires.

Canadian Trade Commission Established at Ottawa

OTTAWA, Feb. 28.—A Canadian Trade Commission has been established at Ottawa for the purpose of facilitating trade relations with other countries. The chairman of this commission, Sir Charles B. Gordon, will continue to act as chairman of the British War Mission, as he has done for the past two years, and will in consequence, spend part of his time at the office of the British War Mission at Washington, D. C. The business of the commission at Ottawa will in the meantime be carried on by Messrs. C. B. McNaught and H. W. Thomson.



New De Luxe Model Offered by Martin Truck and Body Corporation

The Martin Truck and Body Corporation, of York, Pa., manufacturer of the Atlas three-quarter ton truck, is offering a new line of bodies for delivery service. The De Luxe model, which was exhibited at the New York Show, is particularly attractive, and accessibility is one of its features.

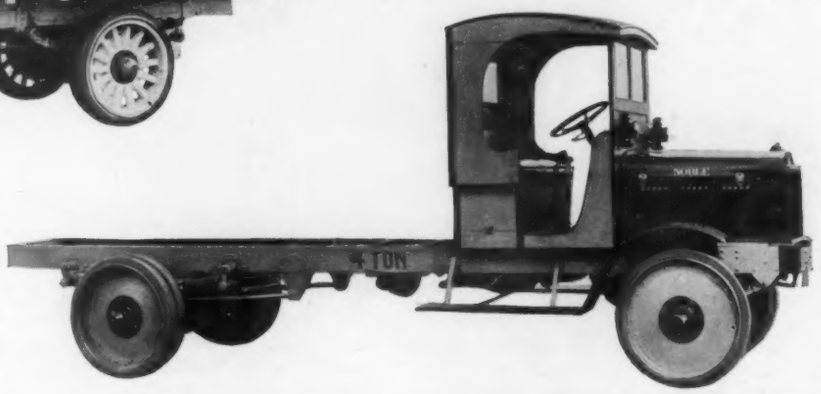
Noble Trucks to be Built in Three Sizes

The history of the Noble Motor Truck Corp. dates back to the year 1917. On February 22, 1917, the Noble Motor Truck Co. was organized with a capital of thirty thousand dollars. During the life of that company a 2½-ton model was developed and placed on the market in a limited way. These trucks met with remarkable success in operation, and it was found that the company required considerable capital to place itself on a production basis. Therefore a new concern was incorporated by the name of the Noble Motor Truck Corporation, with a capital of one million dollars.

This concern has now been in existence about one year, and it has continued the production of the 2½-ton, and also developed a 1½- and a 4-ton model. All of these models are made up of standard units, such as Continental Red Seal engines, Sheldon worm drive axles, Fuller transmissions, Detroit pressed steel frames, Long radiators, Ross steering gears, Eisemann magnetos, Stromberg carburetors, Pierce governors, Oakes fans, and other units of equal class.

The company has since the first of the year moved into the first unit of its new plant, where it has installed machinery sufficient to turn out one truck per day. It is the aim of the company to turn out three hundred trucks during the present year. There are several features about this line of trucks which the Noble corporation has developed. An important feature is the rust-proof radiator, in which the top and bottom cast iron tanks are galvanized to make them absolutely rust proof. The use of grease cups has been eliminated, except for the water pump. All spring and shackle bolts are hollow, and oil is delivered to the bearing through felt wicking, which insures a clean bearing at all times. The three-piece hood has many distinctive advantages. Cab is furnished complete with curtains and windshield without extra cost. Bodies of all types are manufactured in the company's own plant. This enables the Noble corporation to maintain the same standard of quality in its body production, as it aims to maintain in the production of its truck. Retail specifications of the 2½- and 4-ton models will be found in the Commercial Car Specification Table in this issue.

Noble Truck With Stake Body
Bodies of all types are manufactured at the company's plant



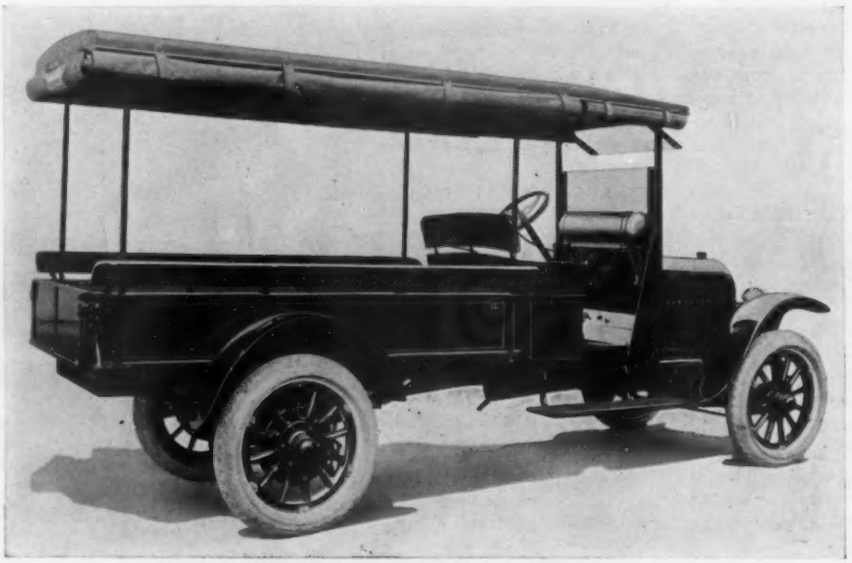
Four-Ton Model Made by the Noble Motor Truck Corporation
All Noble trucks are made up of standard units

The Collier One and One-Quarter Ton Speed Truck

The Collier Model 16 Speed Truck of one and one-quarter ton capacity has just been announced by the Collier Motor Truck Co., of Bellevue, O. The wheelbase is 128 in. and the loading space behind the driver's seat is 8½ ft. It weighs complete 3100 lb., with the body. The chassis equipment includes full set of tools, extra rim, head and tail lamps, electric horn, front fenders, running board, windshield, etc.

The power plant is a four-cylinder L-head engine, with cylinders cast in block; bore 3½ in. and stroke 5 in. The engine has three-point suspension. The transmission is selective type with three speeds forward, and between it and the engine is a 10-in Borg & Beck clutch. The carburetor is a Zenith and the ignition system is the Connecticut, in conjunction with Auto Lite system and Willard battery. The cooling system is thermo-syphon with a zig-zag tube radiator. The fan is 15 in. in. diameter and operates on annular ball bearings.

The drive from the transmission is through a shaft with two joints. The front axle is an I-beam and has extra



The New Collier Model 16
This is known as the Collier 1¼ ton speed truck. It has a 128-in. wheelbase, an 8½-ft. loading space behind the seat, a 3½ by 5-in. engine, and electric starting and lighting

heavy spindles and roller bearing hubs. The rear axle is a bevel gear three-quarter floating, geared 6 to 1, and equipped with roller bearings.

The frame is of pressed steel, 4½ in. deep. Semi-elliptic springs are used all around, 37 x 2¼ in. on the front, and 50 x 2½ in. on the rear. They are of electric furnace steel with hardened and ground spring bolts fitted with grease cups. The steering gear is of worm gear type with an 18-in. wheel. The wheels are artillery type with round wood spokes. The brakes are 14 x 2-in. external and internal. The tires are Firestone, front 32 x 4, with 33 x 4½ cords on the rear. Chassis price is $1375.

The One and a Quarter Ton and Over Work Truck

The Collier Company is also producing what it calls the 1¼-ton and over Work Truck, the specifications of which are identical with that of the Speed Truck just described, except that the bevel gear rear axle is replaced with a worm drive. Rear tires are 34 x 5-in. solids.

The Standley Skid Chain Has Eastern Plant

BOONE, IOWA, Feb. 24. — The Standley Skid Chain Co. has established an assembling plant at Pittsburgh, Pa. In making this announcement, the company states that it will now be in a position to give more prompt and efficient service to its eastern trade. The new sales organization is The American Sales Co., Inc., 334 Second Ave., Pittsburgh, Pa.

The Shaw Commercial Line

THREE models are included in the Shaw line of commercial cars recently announced by the Walden W. Shaw Livery Co., 300 East Huron St., Chicago, Ill. These models are the ¾-ton, Model M-2, at $1650, with 116½-in. wheelbase, and a ¾- 1-ton, which greatly resembles the ¾-ton, except that it has Timken worm drive axle instead of the Timken bevel gear axle, and the Model M-3, 2-ton chassis, at $2950, with a wheelbase of 153 in.

In all these models well-known units are used. The Model M-2 ¾-ton has a Continental 4-cylinder engine, 3¾ x 5 in., with three-point suspension. The clutch and transmission are Brown-Lipe make; the former multiple disc, and the latter selective type, with 3 speeds forward and one reverse. Drive from the power plant is by shaft and Spicer universal joints. The front axle is a Timken, I-beam, drop-forged, and the rear is also Timken, full-floating, with bevel gears. The frame is pressed steel, channel section, and the springs are chrome vanadium steel, front 36 x 2 semi-elliptic, and the rear 53½ x 2¼, also semi-elliptic.

The radiator is the fin and tube type; the steering gear a Gemmer. The carburetion is cared for by a Zenith, with hot air attachment, and the Bosch high-tension magneto, with fixed spark, furnishes ignition current. Pneumatic cord tires are used, 32 x 4 in. The equipment of this chassis includes front fenders, running boards, side and tail lights, horn, tools, jack and tool box.

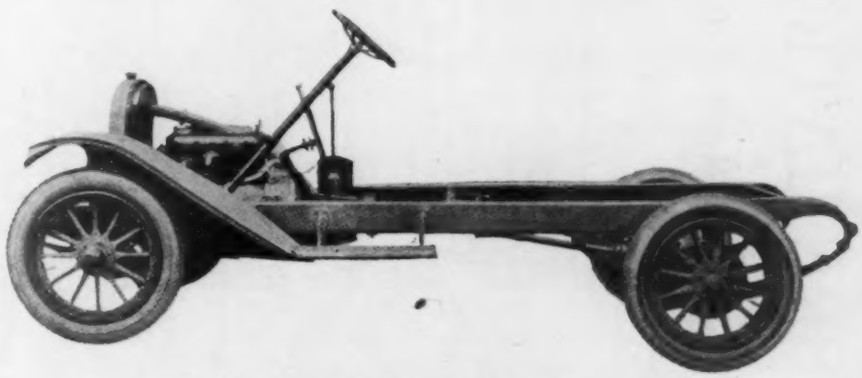
The Three-Quarter One-Ton Model

This model has the same units throughout as the Model M-2, except in the case of the rear axle, which in this model is a worm drive. The frame of this model is of ¼-in. pressed steel. Tires, 34 x 4½-in., pneumatics, are standard equipment.

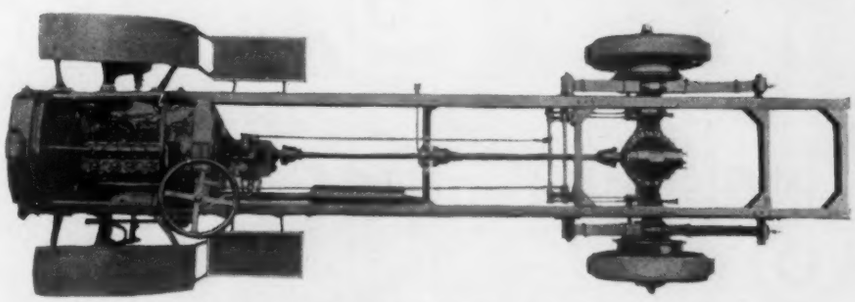
The Model M-3 Two-Tonner

As in the other models, the engine of the 2-ton is the Continental. The bore and stroke are 4⅛ x 5¼ respectively. The clutch and transmission are also Brown-Lipe make, the former being multiple disc and the latter having 3 speeds forward and one reverse. Spicer drive shaft, with Spicer universals are used, the drive from here being through the Timken full-floating, worm drive, rear axle.

The springs on this model are semi-elliptic all around; the front springs 41¾ x 2½, and the rear 54 x 3. The cooling is with a fin and tube core radiator and centrifugal water pump. Gemmer adjustable worm and wheel-type steering gear is used. On this as on the other models, the Zenith carburetor and Bosch magneto are standard equipment. The front tires are 36 x 4 in., solid, and the rear 36 x 7 in., solid. The loading space of this chassis is 14 ft., and the wheelbase 153 in. The speed is 15 m.p.h., governor being included in the equipment. Other details of equipment are the front fenders, running boards, oil lamps, horn, tools, jacks and the cab top.



The Shaw Model M-2, Three-Quarter One-Ton Chassis
This model has a Timken bevel gear rear axle and 116½-inch wheelbase



The Plan View of the Two-Ton Model 3 Chassis
This model has a 153-inch wheelbase and a maximum length loading space of 14 feet. The price is $2950, f. o. b. Chicago

Perry Beam Organizes New Transportation Company

Perry Beam has tendered his resignation as president of the Beam-Fletcher Co., in order to complete the establishment of his own organization, which will render daily motor freight service between Philadelphia, Newark and New York. Merchandise will be transported at rates approximating railway freight, plus cartage costs.

Receiving stations will be maintained at 335 Market St., Newark, N. J.; 459 Canal St., New York, and 425 Market St., Philadelphia.

To Manufacture the Front-mobile

CAMDEN, N. J., March 4.—C. H. Blomstrom, who placed upon the market the Queen car, has completed plans for the manufacture of front-driven trucks and passenger cars. He will occupy a new factory, to be erected at Whitehorse Pike and Pennsylvania Railroad, Camden.

KEY OF ABBREVIATIONS

Used in the Specifications of Commercial Cars Listed on the Pages Following

Own—Own Make
Opt—Optional

Engine: Cont—Continental
Her—Hercules
H-Sp—Herschell-Spillman
Lite—Light Mfg. & Foundry Co.
Lyco—Lycoming
Ster—Sterling
Wau—Waukesha
Wis—Wisconsin

Valve Location: L—ELL-Head
T—TEE-Head
O—Overhead

How Cooled: C—Centrifugal Pump
G—Gear Pump
P—Water Pump
T—Thermo-Syphon
W—Water

Radiator (Make or Type): Bus—Bush
Can—Candler
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Har—Harrison
Hovn—Hooven
Idl—Ideal
JMS—Jamestown
Lng—Long
McC—McCord
May—Mayo
MR—Marlin-Rockwell
Per—Perfex
R-T—Rome-Turney
Stan—Standard

C—Cellular
T—Tubular
H—Honeycomb

Tires: (Solid unless otherwise stated).
*—Pneumatic
D—Dual
S—Steel
T—Triple

Lubrication: C—Centrifugal Pump
Fo—Force-Feed
FG—Force and Gravity
FS—Force and Splash
Sp—Splash Feed
P—Water Pump

Carburetor: B&B—Ball & Ball
Cart—Carter
Ens—Ensign
Flch—Flechter
Holl—Holley
John—Johnson
Mar—Marvel
Mas—Master
Mill—Miller
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler
Spc—Special
Till—Tillotson
Zen—Zenith

Ignition System: (Make or Type)
At-Kt—Atwater Kent
Au-L—Auto-Lite
Bat—Battery
Bosh—Bosch
Berl—Berling
Conn—Connecticut
Delc—Delco
Dix—Dixie
Eism—Eisemann
King—Kingston
Mag—Magneto
NE—North East
POL—Prest-O-Lite
Sim—Simms
Spld—Splitdorf

Engine Starter: Au-L—Auto Lite
Bosh—Bosch
Bij—Bijur
Dyn—Dyneto
G&D—Gray & Davis
L-N—Leece-Neville
West—Westinghouse

Clutch: B—Borg & Beck
C—Cone
D—Disc
F—Fuller
G—Detroit Gear & Machine
H—Hartford
L—Brown-Lipe
M—Merchant & Evans (Hele-Shaw)
U—Muncie
W—Warner
O—Own

Transmission: B-Lipe—Brown-Lipe
Cott—Cotta
Covt—Covert
Det—Detroit
Durst—Durston
Full—Fuller
G-Lee—Grant-Lees
I-CI—Individual Clutch
MM—Mechanics Machine Co.
Munc—Muncie
Plan—Planetary
Prog—Progressive
Rock—Rockford
Selec—Selective
Warn—Warner

Drive: B—Bevel Gear
C—Chain
Ct—Concentric Spur
F—Friction
I—Internal Gear
O—Own
R—Roller
S—Shaft
SB—Spiral Bevel
Sp—Spur
W—Worm

Universal: Arv—Arvac
Bld—Blood Brothers
Hart—Hartford
K-B—Kinsler-Bennett
M—Merchant & Evans
Spic—Spicer
Ther—Thermoid
UM—Universal Machine Co.
UP—Universal Products Co.

Rear Axle: Cel—Celfor
Cl—Clark
Emp—Empire
Rock—Rockford
Russ—Russel
Sals—Salisbury
Shel—Sheldon
Timk—Timken
Torb—Torbensen
W-M—Weston-Mott

Flot—Full Floating
½-Fl—Semi-Floating
¾-Fl—¾ Floating
⅞-Fl—⅞ Floating

Spring Suspension:
CC—Cleveland-Canton
Det—Detroit
IC—Iron City
Kal—Kalamazoo
Mar—Maremont
Math—Mather
Nat—National
Row—Rowland
Per—Perfection
Shel—Sheldon
SP—Spring Perch
Stan—Standard
Ster—Sterling
Tut—Tuthill
US—United States

Cant—Cantilever
Elip—Full Elliptic
S-El—Semi-Elliptic
¾-El—¾-Elliptic
S&C—Semi-Elliptic and Cantilever
S&¾—Semi-Elliptic and ¾-Elliptic

Steering Gear:
CAS—C. A. S. Products Co.
Dit—Ditwiler
Gem—Gemmer
Jac—Jacox
Lav—Lavine
W—Worm
Warn—Warner
Wohl—Wohlrab

Governor: C—Centrifugal
Cont—Continental
Del—Delaney
Dup—Duplex
McC—McCanna
Mer—Merrill
Mon—Monarch
Pier—Pierce
Rug—Ruggles
Simp—Simplex
Wau—Waukesha

EXTRA ABBREVIATIONS USED ON ELECTRICS

Battery: Exid—Exide
Edis—Edison
Phil—Philadelphia

Motor: Gn-El—General Electric Co.
West—Westinghouse

Controller: Gn-El—General Electric Co.
West—Westinghouse

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks and Electric Commercial Cars Will be Found at the End of Gasoline Commercial Cars

Model	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr.Cent of Weight on Rear Wheels
800 Pounds															**800 Pounds**													
Minnesota	800	320	Own	4	2¾x4	12.8	3	1/16	L	T	H	FS	Strm	At-K	....	..	Fric	3	Dead	O'n	Ch	92	Tut	28x3	28x3	Own	....	60
Overland	1777	1000	Own	4	3⅜x5	18.2	4	1/16	L	T	C	FS	Till	Conn	Au-L	C	Selec	3	Own	B	¾Fl	104	S&C	31x4*	31x4*	Own	....	63.8
1000 Pounds															**1000 Pounds**													
Briscoe 4-24	....	825	Own	4	3 1/16x5⅛	16.9	3	1/16	L	T	C	FS	Buick	Bat	Au-L	C	Own	3	Own	B	½Fl	103	....	30x3½*	30x3½*	Own	....	....
Corliss 1919	1450	715	LRoi	4	3⅛x4½	16.9	4	..	..	T	FS	Sheb	Dix	Al-Ch	B	Covt	3	Arv	BG	½Fl	103	Har	31x4*	31x4*	Wohl	....	80
Dodge	1820	935	Own	4	3⅞x4½	24	3	1/16	L	C	T	FS	Stew	NE	NE	D	Selec	3	Own	SB	Flot	114	Det	33x4	33x4	Own	....	41
Moore C	1800	....	GBS	4	3¾x4¼	22.5	3	1/16	..	..	..	...	KD	Au-L	Au-L	GL	GLee	3	UP	P	½Fl	106	¾El	30x3½	30x3½	Gae	....	95
Rainier R-5	2200	1250	Lite	4	3¼x4⅛	18	3	1/16	L	T	Har	FS	Zen	Dix	....	L	B-Li	3	Hart	W	½Fl	115	Per	33x4*	33x4*	Lav	....	80
Velie	2750	2000	Cont	6	3½x5¼	29.6	3	¼	L	C	H	FS	Rayf	Will	Remy	B	Selec	3	Spic	B	Timk	154	Math	35x5*	35x5*	Gem	....	50
Vim 21	1950	945	Own	4	3x4½	14.4	3	1/16	L	T	H	FS	Zen	Dix	....	C	Selec	3	Spic	B	Own	108	Shel	31x4*	31x4*	Jac	....	....
Winther 39	....	2100	Wis	4	3¾x5	22.5	3	¼	L	P	T	G	Strm	Elsm	Bij	F	Full	3	Arv	I	Cl	140	Har	34x3½	34x5	Lav	....	70
1200 Pounds															**1200 Pounds**													
Overland	2179	1075	Own	4	4⅛x4½	27.2	2	⅜	L	T	C	FS	Till	Dix	Au-L	C	Selec	3	Own	SB	¾Fl	106	S-El	33x4½*	33x4½*	Own	....	68.8
1500 Pounds															**1500 Pounds**													
Atlas 19	2320	1135	Lyco	4	3½x5	19.6	3	1/16	L	T	H	Sp	Cart	Remy	Remy	B	Selec	3	Arv	B	Hess	118	Row	32x4*	32x4*	CAS	....	75
Dispatch G	2200	1200	Wis	4	3¾x5	22.5	3	1/16	L	T	C	Fo	Rayf	Bosh	USL	O	Own	4	Bld	I	Dead	120	Tut	34x4*	34x4*	W	....	50
Famous 10	2100	800	Lyco	4	3¼x5	19.6	..	..	L	T	H	Fo	Cart	Opt	....	C	Rock	3	Acme	B	Rock	110	Own	....	....	Ross	....	....
G. M. C. 16	2760	1495	Cont	4	3⅜x5	22.5	3	1/16	L	C	McC	FS	Mar	Elsm	....	D	Selec	3	UM	B	WM	132	Det	35x5*	35x5*	Jac	Mon	67
International H	2800	1550	Own	4	3½x5¼	19.6	3	1/16	L	C	T	FS	Holl	Bosh	Own	D	Selec	3	Own	I	Own	115	....	36x3	36x3½	Ross	Own	50
Old Hickory M	2100	995	Lyco	4	3¼x5	16.9	3	1/16	L	T	C	Sp	Cart	Will	Dyn	C	Selec	3	Own	B	½Fl	112	....	33x4*	33x4*	W	....	60
Rainier R 2	2700	1350	Lite	4	3¼x4¼	16.9	3	1/16	L	T	Har	FS	Zen	Dix	....	L	B-Li	3	Hart	W	½Fl	125	Per	34x4*	34x4*	....	....	80
Reo F	2525	1350	Own	4	4⅛x4½	27.2	3	1/16	L	C	Own	Sp	John	Remy	Remy	O	Own	3	Own	B	Own	128	Penn	34x4½*	34x4½*	Own	....	62½
Shaw M-2	....	1650	Cont	4	3⅜x5	22.4	3	1/16	L	T	T	FS	Zen	Bosh	....	L	B-Li	3	Spic	BG	Timk	116	Per	32x4*	32x4*	Gem	....	65
Steward 6	1750	950	LRoi	4	3⅛x4½	15.6	3	1/16	L	T	C	FS	Zen	Elsm	....	D	MM	3	Hart	I	IC	110	Det	33x4*	33x4*	CAS	....	80
Tiffin A	2575	1100	Cont	4	3½x5	19.6	3	1/16	L	T	T	FS	Sheb	Bosh	....	C	Det	3	UP	I	Russ	110	Kal	35x4½*	35x4½*	Lav	LRoi	80
Vim 26	2200	1200	Own	4	3x4½	14.4	3	1/16	L	T	H	FS	Zen	Dix	....	C	Selec	3	Spic	B	Own	127	Shel	32x4½*	32x4½*	Jac	....	....
White G B B E	2960	2300	Own	4	3¾x5½	22.5	3	..	L	C	C	FS	Own	Mag	....	D	Selec	4	Own	B	½Fl	133	....	34x4½*	34x4½*	Own	....	....
1 Ton															**1 Ton**													
Acme B	3200	1950	Cont	4	3¾x5	22.5	3	1/16	L	T	GO	FS	Rayf	Elsm	G&G	B	Cott	3	Bld	W	Timk	130	D&P	34x3½	34x5	Ross	Dup	80
All-American A-A	2800	1295	H-Sp	4	3¾x5	16.9	3	1/16	L	T	Stan	FS	Strm	Dix	....	B	GLee	3	UP	I	Torb	130	Det	33x4*	32x4	Ross	....	75
Beck-Hawkeye A	2800	1350	Cont	4	3½x5	....	..	..	T	H	Sp	Strm	Bosh	....	F	Full	3	Bld	I	½Fl	124	Hig	34x3	34x4	Lav	Pier	75
Bessemer G	3200	1575	Cont	4	3½x5	19.6	3	1/16	L	T	C	FS	Zen	Bosh	....	F	Full	3	Arv	I	Torb	124	Per	34x3½	34x4	Ross	....	....
Brinton H	2800	1500	Wis	4	3¾x5	16.9	3	1/16	L	T	T	FS	Rayf	....	....	D	Selec	3	....	W	Flot	125	....	....	....	....	....	....
Briscoe T-34	....	....	Own	4	3⅜x5	18.9	3	1/16	L	T	C	FS	Buick	Bat	Au-L	C	Own	3	UM	..	Russ	121	....	....	....	....	....	....
Chevrolet T	2840	1325	Own	4	3 1/16x5⅛	22.5	3	1/16	O	C	T	FS	Zen	Remy	Au-L	C	Warn	3	Arv	W	½Fl	125	Hess	31x4	31x4	Warn	Mon	....
Columbia F	2800	1750	Cont	4	3¾x5	22.5	3	1/16	L	P	T	FS	Shk	Dix	....	B	Covt	3	Spic	..	Russ	126	Per	32x3	32x4	Own	Pier	80
Commerce E Ch	2900	1500	Cont	4	3¾x5	22.5	3	1/16	L	T	Lng	FS	Zen	Elsm	Bij	C	Selec	3	Spic	I	Torb	126	Det	34x3	34x4	Jac	....	80
Corbitt E	3050	2000	Cont	4	3¾x5	22.5	3	1/16	L	T	Idl	Sp	Strm	Elsm	G&D	D	Full	3	....	W	Shel	130	Shel	34x3½	34x4	Lav	Pier	80
Dart E	3200	2100	Buda	4	3½x5⅛	19.6	4	⅛	L	T	C	Sp	Zen	Elsm	....	F	Full	3	Arv	W	Timk	130	Per	34x3½	34x5	Ross	....	80
Dearborn A	2100	975	GBS	4	3¾x4¼	22.5	3	1/16	L	T	H	Sp	Strm	Dix	....	GB	GLee	3	Arv	Ch	CC	125	C-C	30x3½*	30x3½*	Dit	....	90
Denby 12	2770	1650	Cont	4	3½x5	19.6	3	1/16	R	T	Lng	Sp	Strm	Elsm	....	D	Selec	3	UP	I	Russ	124	Det	34x3	34x4	Ross	Mon	72
Diamond T-J 5	3050	2125	Cont	4	3½x5	19.6	3	1/16	L	T	T	FS	Strm	Bosh	....	L	B-Li	3	Spic	W	Timk	126	Math	36x3	36x4	Gem	Pier	
Famous B-10	3000	1690	Cont	4	3½x5	19.6	3	1/16	L	T	T	Sp	Strm	Elsm	....	F	Full	3	Bear	I	Cl	120	Det	36x3½	36x4	Ross	Mon	75
Federal S	3900	1900	Cont	4	3¾x5½	22.5	4	1/16	L	C	T	FS	Zen	Elsm	....	B	Own	3	Spic	W	Timk	132	Math	34x3	34x4	Gem	Mon	75
Ford T	1450	550	Own	4	3¾x5	22.5	3	¼	L	T	T	Sp	Holl	Mag	....	D	Plan	2	....	W	½Fl	124	....	30x3*	32x3½	....	....	....
Gabriel C	2750	1950	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Fo	Rayf	Bosh	L-N	B	B-Li	3	Spic	W	Timk	144	Mer	35x5*	35x5*	Gem	Dup	65
Garford 75 C	3900	2500	Buda	4	3¾x5½	22.5	3	1/16	L	C	Own	Sp	Rayf	Spld	....	B	B-Li	3	Spic	W	Timk	128	Per	34x4½*	36x4	Ross	Simp	....
Gary F	2000	....	Cont	4	3¾x5	22.5	3	1/16	L	T	T	Sp	Strm	Elsm	....	F	Full	3	Hart	W	Shel	130	Tut	36x3½	36x4	Lav	Ser	Pier
Giant 15	2950	1850	Cont	4	3½x5	19.6	3	1/16	L	T	Idl	FS	Sheb	Elsm	....	W	Warn	3	Spic	W	Timk	138	Math	34x3½	34x5	Jac	....	94
G. M. C. 21	3794	2025	Cont	4	3¾x5	22.5	3	1/16	L	C	McC	FS	Mar	Elsm	....	D	Selec	3	UM	W	Timk	136	Det	34x3½	34x5	Lav	Mon	69
Grant 12	2300	1125	H-Sp	4	3¼x5	16.9	3	¼	L	T	Fed	FS	Cart	Dix	Bij	B	GLee	3	Arv	I	Torb	115	Per	32x4*	32x4*	Dit	....	65
Hahn G	3600	1375	Cont	4	3½x5	19.6	3	1/16	L	T	Idl	Fo	Strm	Mag	....	D	Det	3	Spic	I	Torb	130	Del	34x3	34x4	Lay	....	65
Hahn C	4200	1950	Cont	4	4⅛x5¼	30	4	¼	L	C	Own	Fo	Strm	Bosh	....	D	B-Li	3	Spic	W	Timk	136	Del	36x3½	36x5	Ross	Pier	65

Model	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr. Cent of Weight on Rear Wheels
1 Ton—Continued																												
Higrade A 18	2900	2100	Cont	4	3½x5	19.6	3	1/8	L	T	Per	FS	Zen	Sim	L-N	F	Full	3	Bld	W	Shel	115	Per	35x5	35x5	Lav	Dup	66
Hoover 15-B	2425	1435	Cont	4	3½x5	19.6	3	1/8	L	T	Can	Fo	Sheb	Dix	....	F	Full	3	Acme	W	Shel	120	Shel	34x3	34x4	Lav	....	80
Independent B	2700	1550	Cont	4	3½x5	19.6	3	..	L	C	T	FS	Strm	Bosh	....	..	Full	3	Bld	I	Dead	132	Gar	33x3	33x4	Lav	....	70
International F	3000	1850	Own	4	3½x5¼	19.6	3	1/8	L	C	V	FS	Holl	Bosh	Own	D	Selec	3	Own	I	Own	128	....	36x3½	36x4	Ross	Own	50
Jones 31 A	3400	1395	Cont	4	3½x5	19.6	3	1/8	L	T	C	Fo	Strm	Eism	....	B	Covt	3	Arv	I	Russ	130	Penn	34x3½	34x4	Warn	Pier	80
Larabee-D. M.	3400	1250	Cont	4	3¾x5	22.5	3	1/8	L	T	Bus	Sp	Sheb	Bosh	....	F	Full	3	UM	W	Shel	130	Mer	34x3½	34x5	Lav	Pier	....
Mack	4250	2400	Own	4	4x5	25.6	3	..	L	C	H	FS	Strm	Dix	....	D	Selec	3	....	C	Dead	Opt	....	36x4	36x3½D	....	Own	53
Maxwell	2385	1085	Own	4	3⅝x4½	21.3	3	1/8	L	T	T	FS	John	At-K	....	C	Selec	3	Own	W	½Fl	124	Shel	32x3	32x4	Own	....	50
Menominee	....	1890	Cont	4	3¾x5	22.5	3	1/8	L	T	C	Sp	Strm	Eism	....	F	Selec	3	Own	W	Timk	130	Tut	34x3½	34x5	Ross	Mon	80
Moreland 17 N	2940	2175	Cont	4	3¾x5	22.5	3	1/8	L	T	C	Sp	Mill	Dix	....	D	Selec	.	Ther	W	Timk	126	US	34x3½	34x4	Ross	....	....
Meyers 50	2750	1495	Lyco	4	3½x5	19.6	3	1/8	L	T	C	FS	Cart	Delc	Dyn	D	MM	3	UM	W	Emp	130	C-C	34x4*	34x4	CAS	....	75
Meyers 55	2700	1460	Lyco	4	3½x5	19.6	3	1/8	L	T	C	FS	Cart	Swis	....	D	MM	3	UM	W	Emp	130	C-C	34x3½	34x4	CAS	....	75
Napoleon	3400	1285	Gray	4	3½x5	19.6	3	¼	O	T	T	Sp	Strm	Conn	Au-L	F	Full	3	UP	..	Cl	132	....	32x3½	32x4	Gem	....	....
Nash 2018	3400	1650	Own	4	3¾x5¼	22.5	4	¼	L	C	T	Fo	Strm	Eism	Opt	B	Selec	3	Own	I	Celf	130	Stan	34x3	34x4	Jac	Simp	80
Nels. & LeMoon F1	2900	2000	Cont	4	3¾x5¼	22.5	3	1/8	L	T	T	Sp	Strm	Bosh	W	L	B-Li	3	Own	W	Timk	...	Tut	36x3	36x4	Lav	Mon	80
Norwalk	1650	1495	Lyco	4	3½x5	28.5	3	1/8	L	T	C	Sp	Cart	Delc	Dyn	D	MM	3	UM	W	½Fl	130	C-C	34x4*	34x4	CAS	....	90
Ogden A1	3400	2095	Cont	4	3¾x5	22.5	3	1/8	L	T	T	FS	Rayf	Bosh	....	B	B-Li	3	Acme	W	Timk	136	Tut	36x3	36x4	Gem	Pier	70
Oneida A	4320	2290	Cont	4	3¾x5¼	22.5	3	1/8	L	C	Lng	FS	Strm	Bosh	Opt	M	Cott	3	Spic	W	Timk	130	Math	36x3½	36x5	Ross	Pier	82
Packard 1-E	4500	2650	Own	4	4x5½	25.6	3	¼	L	C	C	Fo	Own	Dix	Bij	D	Selec	4	Spic	W	Flot	126	SP	34x3½	34x4D	Own	Own	48
Panhard	3200	1195	Gray	4	3½x5	19.6	3	1/8	O	T	Per	Sp	Strm	Au-L	Opt	F	Full	3	UP	I	Torb	130	Det	32x3¼*	32x3½	Lav	....	80
Piedmont O	....	....	Lyco	4	3½x5	19.6	3	1/8	L	T	Stan	Fo	Cart	Bat	Dyn	B	Selec	3	Hart	W	Emp	130	S-El	33x4*	33x4	....	....	....
Rainier R-7	2800	1550	Cont	4	3½x5	19.6	3	1/8	L	T	Har	FS	Zen	Sim	....	L	B-Li	3	Hart	W	½Fl	125	Per	34x4	34x4	Lav	Mon	80
Republic 10	2922	1535	Cont	4	3½x5	19.6	3	1/8	L	T	C	FS	Strm	Eism	....	D	Full	3	Arv	I	Torb	124	Opt	....	....	Jac	Rug	....
Royal	....	2400	Wis	4	3¼x5	16.9	..	..	..	C	T	...	Strm	Bosh	Opt	B	Own	.	Own	W	Timk	128	Mer	34x4	34x5	Ross	Mon	....
Sandow G	3000	1795	Cont	4	3½x5	19.6	3	1/8	L	T	T	FS	Strm	Eism	....	D	Full	3	UM	W	Shel	120	Det	34x3½	34x5	Ross	....	66
Selden TXR	3000	2000	Cont	4	3½x5	19.6	3	1/8	L	T	Bus	Sp	Strm	Bosh	....	L	B-Li	3	Spic	I	Russ	140	Per	34x3½	34x5	Lav	Pier	70
Selden TWL	3225	2200	Cont	4	3½x5	19.6	3	1/8	L	T	Bus	Sp	Strm	Bosh	....	L	B-Li	3	Spic	W	Timk	140	Per	34x3½	34x5	Lav	Pier	70
Service 220	3470	2100	Buda	4	3½x5⅛	19.6	3	1/8	L	C	T	FS	Strm	Eism	....	D	Selec	3	Arv	W	Timk	137	....	34x3½	34x5	Ross	....	64
Signal F	4265	2400	Cont	4	4⅛x5¼	27.2	3	1/8	L	C	McC	FS	Strm	Eism	....	L	B-Li	4	Spic	W	Timk	144	Per	34x3½	36x5	Ross	Pier	80
Stewart 8	2820	1575	Cont	4	3½x5	19.6	3	1/8	L	T	T	FS	Zen	Eism	....	B	Durst	3	Hart	I	IG	130	Det	34x3½	34x4	Gem	Mon	80
Vim 25	3900	2195	Her	4	3¾x5½	22.5	3	1/8	L	C	T	FS	Zen	Dix	....	D	Selec	3	Spic	W	Shel	120	Shel	34x4½*	34x4½*	Jac	Dup	....
Wichita K	3400	2000	Own	4	3½x5	19.6	3	1/8	L	T	Per	Sp	Strm	Bosh	Own	C	Covt	3	Own	W	Shel	144	Det	36x3	36x4	Ross	....	....
Wilson F	3150	1750	Cont	4	3½x5	19.6	3	1/8	L	T	H	FS	Strm	Eism	....	D	Covt	3	Bld	W	Timk	124	Shel	35x5*	35x5*	Ross	Pier	75
1¼ Ton																												
Collier 16	2600	1375	Lyco	4	3½x5	19.6	3	¼	L	T	Jms	Sp	Zen	Conn	Au-L	B	GLee	3	Ther	B	Sals	128	Ster	33x4½	33x4½	Dit	....	50
Comet 1½	2800	1750	Lyco	4	3½x5	19.6	4	1/8	L	T	Stan	FS	Cart	Au-L	Dyn	B	Munc	3	UP	W	Stan	130	Mar	34x4*	34x4	CAS	....	85
Koehler K	3000	1450	Own	4	3½x5	19.6	3	1/8	L	T	T	FS	Strm	Eism	....	MM	MM	3	K-B	I	Torb	129	....	34x3	34x4	Own	Mon	70
Rainier R-4	3100	1595	Lite	4	3¼x4⅛	16.9	3	1/8	L	T	Har	FS	Zen	Dix	....	L	B-Li	3	Hart	W	½Fl	125	Per	31x4*	32x4	Lav	Mon	80
Sandow C G	3300	2090	Cont	4	3½x5	19.6	3	1/8	L	T	T	FS	Strm	Eism	....	D	Full	3	UM	W	Shel	134	Det	34x3½	34x5	Ross	....	67
1½ Ton																												
Acason R	3650	....	Wau	4	3¾x5½	22.5	3	¼	L	P	C	Sp	Sheb	Eism	....	F	Full	3	Bld	W	Timk	142	Det	36x3½	36x5	Ross	Wau	73
Atterbury 7R	4770	2575	Cont	4	4⅛x5¼	27.2	3	¼	L	C	T	Sp	Zen	Eism	....	L	B-Li	4	Spic	W	Timk	140	SP	36x3½	36x5	Gem	Pier	96.5
Beck-Hawkeye B	3200	1750	Cont	4	3¾x5	....	..	..	..	T	H	Sp	Strm	Bosh	....	F	Full	3	Bld	I	½Fl	144	Hig	34x3½	34x5	Lav	Pier	75
Bessemer H	....	1945	Cont	4	3¾x5	22.5	3	1/8	L	T	C	FS	Zen	Dix	....	B	B-Li	3	Arv	I	Torb	144	Per	36x3½	36x5	Ross	....	....
Bethlehem D	3300	1965	Own	4	3¾x4½	22.5	3	¼	L	T	Fed	FS	Sheb	Bat	G&D	B	Det	3	UP	I	Russ	136	Shel	34x3½	34x5	Lav	Mon	85
Brockway J-2	4000	2450	Cont	4	3¾x5	22.5	3	1/8	L	T	Bus	FS	Sheb	Eism	....	H	B-Li	3	Spic	W	Timk	140	Mer	36x3½	36x5	Gem	Opt	70
Concord A	4200	2550	Buda	4	3¾x5½	22.5	3	¼	L	C	T	Sp	Zen	Eism	....	L	B-Li	3	Spic	W	Timk	140	Per	36x3½	36x5	Ross	Mon	70
Corbitt D	3890	2400	Cont	4	3¾x5	22.5	3	1/8	L	T	Idl	FS	Strm	Eism	G&D	D	Full	3	....	W	Shel	138	Shel	36x3½	36x5	Ross	Pier	75
Day-Elder A	3500	1775	Cont	4	3½x5	19.6	3	1/8	L	T	Bush	FS	Zen	Berl	....	B	Covt	3	Hart	W	Wis	128	IC	34x3	34x4	Ross	....	70
Dearborn F	3280	1980	Cont	4	3½x5	19.6	3	¼	L	T	T	Sp	Strm	Bosh	....	F	Full	3	Arv	W	Stan	126	Tut	34x4	34x5	Lav	....	80
Defiance B	3200	1795	Cont	4	3¾x5	22.5	3	1/8	R	T	Per	FS	Strm	Eism	....	B	GLee	3	Arv	I	Torb	135	Det	34x3½	34x5	Dit	Mon	85
Diamond TJ4	3700	2550	Cont	4	3¾x5	22.5	3	1/8	L	T	T	FS	Strm	Bosh	....	L	B-Li	3	Spic	W	Timk	127	Math	36x3½	36x5	Gem	Pier	....
Douglas TA	3100	2000	Buda	4	4⅛x5½	27.2	3	1/8	L	C	May	FS	Sheb	Eism	....	B	GLee	3	Arv	I	Torb	127	Own	34x3½	34x5	Ross	Pier	65
Famous B-12	3600	2250	Cont	4	3¾x5	22.5	3	1/8	L	C	T	Sp	Strm	Eism	....	F	Full	3	Bear	I	Cl	138	Det	36x3½	36x5	Ross	Mon	75
Federal T	4250	2350	Cont	4	4⅛x5¼	27.2	3	1/8	L	C	T	Sp	Zen	Eism	....	B	Own	4	Spic	W	Timk	156	Math	36x3½	36x5	Gem	Mon	76
Fulton FX	3120	1850	H-Sp	4	3⅜x5	18.2	3	1/8	L	C	T	GO	FS	Cart	Sim	....	B	Det	3	Hart	I	Russ	136	S-El	34x3½	34x5	Lav	....	70
Garford 66 B	4180	3000	Buda	4	3¾x5½	22.5	3	1/8	L	C	T	Sp	Rayf	Spld	....	L	Own	4	Spic	W	Timk	144	Per	36x3½	36x5	Ross	Simp	....
Gary G	3000	....	Buda	4	4¼x5½	28.9	3	¼	L	P	T	C	Strm	Eism	....	F	Full	3	Hart	W	Shel	144	Tut	36x3½	36x5	Lav	Pier	....
Giant 14	3600	2250	Cont	4	3½x5	19.6	3	1/8	L	T	C	FS	Sheb	Eism	....	W	Warn	3	Spic	W	Timk	138	Math	34x3½	34x5	Jac	....	94
G. M. C. 31 A	4110	2395	Cont	4	3¾x5	22.5	3	1/8	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	130	Det	36x3½	36x5	Lav	Mon	74
G. M. C. 31 B	4150	2395	Cont	4	3¾x5	22.5	3	1/8	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	144	Det	36x3½	36x5	Lav	Mon	74
Gramm-B 15	3700	1895	Cont	4	3¾x5	22.5	3	1/8	R	T	T	Sp	Strm	NE	....	D	Selec	3	Arv	I	Cl	138	....	36x3½	36x5	Ross	....	....
Grant 10	3000	1885	Cont	4	3¾x5	22.5	3	¼	L	T	Fed	FS	Cart	Dix	Remy	B	GLee	3	Arv	I	Torb	124	Per	34x4½*	34x5	Jac	Pier	65
Grant 11	3100	1935	Cont	4	3¾x5	22.5	3	¼	L	T	Fed	FS	Cart	Dix	Remy	B	GLee	3	Arv	I	Torb	140	Per	34x4½*	34x5	Jac	Pier	65
Hahn D	4600	2225	Cont	4	4⅛x5	30	4	¼	L	C	Own	Fo	Strm	Bosh	....	D	B-Li	3	Spic	W	Timk	142	Del	36x3½	36x6	Ross	Pier	65
Hawkeye K	3400	1900	Buda	4	3¾x5½	22.5	3	1/8	L	C	C	FS	Zen	Eism	....	F	Full	3	Hart	I	Cl	148	Det	34x3½	34x5	Gem	Simp	70
Independent D	3900	1890	Cont	4	3¾x5	22.5	3	..	L	C	T	FS	Strm	Bosh	....	..	Full	3	Bld	I	Dead	135	Gar	34x3½	34x5	Lav	....	70
International K	3400	2200	Own	4	3½x5¼	19.6	3	1/8	L	C	T	FS	Holl	Bosh	Own	D	Selec	3	Own	I	Own	128	....	36x3½	36x5	Ross	Own	50
Kelly-Spfd K 31	4590	2750	Own	4	3¾x5¼	22.5	3	¼	L	C	Fed	Fo	Zen	Eism	....	C	Covt	3	Own	C	Dead	144	Per	36x3½	36x6	Gem	Own	89
Kelly-Spfd K 32	4685	2750	Own	4	3¾x5¼	22.5	3	¼	L	C	Fed	Fo	Zen	Eism	....	C	Covt	3	Spic	W	½Fl	144	Per	36x3½	36x6	Gem	Own	89
Kissel	3500	2073	Own	4	3⅞x5½	24.1	3	1/8	L	C	McC	Sp	Strm	Eism	....	D	Warn	3	Spic	W	Shel	152	Math	34x3½	34x5	Jac	Pier	80

Model	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr.Cent of Weight on Rear Wheels
1½ Ton—Continued																												
Lane G	3940	2250	Cont	4	3¾x5½	22.5	3	¼	L	T	Hvn	FS	Strm	W	....	F	Full	3	Acme	W	Wis	144	Kal	34x4	34x5	Ross	Pier	....
Maccar L	4050	2750	Cont	4	4½x5¼	27.2	3	5/32	L	C	Own	FS	Strm	Bosh	....	L	B-Li	3	Spic	W	Timk	150	Mer	36x4	36x5	Ross	Pier	80
Mack AB	4800	2800	Own	4	4x5	25.6	3	..	L	C	H	FS	Strm	Dix	....	D	Selec	4	....	C	Dead	Opt	....	36x3½D	....	Own	....	46
Manly 30	....	2050	Wau	4	3¾x5½	22.5	3	¼	L	C	T	FS	Zen	Eism	....	F	Selec	3	Ther	W	½Fl	144	Shel	36x4	36x5	Lav	Wau	....
Master Junior JW	3800	1990	Buda	4	4⅛x5½	27.2	3	5/32	L	C	T	Sp	Mas	Eism	....	D	Full	3	Arv	W	Timk	142	Det	34x3½	34x5	Wohl	McC	78
Master Junior JI	3800	1890	Buda	4	4⅛x5½	27.2	3	5/32	L	C	T	Sp	Mas	Eism	....	D	Full	3	Arv	IG	Torb	142	Det	34x3½	34x5	....	McC	78
Moreland HB	4150	2650	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	C	Fo	Mill	Dix	....	D	Selec	4	Ther	W	Timk	126	US	36x3½	36x5	Ross	....	....
Myers 70	3000	1750	Lyco	4	3½x5	19.6	3	5/32	L	T	C	FS	Cart	Delc	Dyn	B	GLee	3	UM	W	Emp	130	C-C	34x3½	34x5	CAS	....	75
Myers 75	2950	1700	Lyco	4	3½x5	19.6	3	5/32	L	T	C	Sp	Cart	Swis	....	B	GLee	3	UM	W	Emp	130	C-C	34x3½	34x5	CAS	....	75
Napoleon 11	3450	1485	Gray	4	3½x5	19.6	3	¼	O	T	T	Sp	Strm	Conn	Bat	L	Full	3	H.Cl	I	IG	132	S-El	35x5	35x5	Lav	....	65
Nelson&LeMonF1½	3400	2425	Cont	4	3¾x5¼	22.5	3	5/32	L	C	T	Sp	Strm	Bosh	West	L	B-Li	3	Own	W	Timk	...	Tut	36x3½	36x5	Lav	Mon	80
Norwalk	1850	1750	Lyco	4	3½x5	19.6	3	5/32	L	T	C	FS	Cart	Swis	....	B	GLee	3	UM	W	Stan	130	C-C	34x3½	34x6	CAS	....	75
Oklahoma 1½ T	3850	2450	Rut	4	4½x5½	27.2	3	5/32	L	C	T	FS	Cart	Dix	....	D	Selec	3	Hart	W	Stan	148	Tut	36x4	36x5	W	Pier	85
Old Reliable WA	4150	2350	Wis	4	4¼x5¼	27.2	3	5/32	L	C	L	FS	Strm	Bosh	Opt	M	Cott	3	Spic	W	Timk	130	Math	36x3½	36x6	Ross	Pier	82
Oneida B	5280	2650	Cont	4	4⅛x5¼	27.2	3	¼	L	C	L	Fo	Stan	Bosh	Opt	M	Cott	3	Spic	W	Timk	130	Math	36x3½	36x6	Ross	Pier	....
Packard 1½ E	4600	3000	Own	4	3½x5	19.6	3	5/32	O	T	Per	Sp	Strm	Au-L	....	F	B-Li	3	Spic	W	Shel	138	Shel	34x3½	34x4D	Own	Own	48
Panhard B	3600	1395	Gray	4	3½x5	19.6	3	5/32	O	T	Per	Sp	Strm	Au-L	Opt	D	Full	3	WP	I	Torb	130	Det	32x3½	32x4	Lav	....	80
Patriot Lincoln	3400	2150	Cont	4	3¾x5	22.5	3	5/32	L	T	H	FS	Strm	Bosh	....	D	Selec	3	....	H	....	135	S-El	34x3½	34x5	W	Pier	75
Piedmont	....	....	Lyco	4	3½x5	19.6	3	5/32	L	T	Stan	Fo	Cart	Bat	Dyn	B	Selec	3	Hart	W	Emp	140	S-El	....	....	....	....	....
Rainier R-6	3400	1890	Cont	4	3½x5	19.6	3	5/32	L	T	Har	FS	Zen	Sim	....	L	B-Li	3	Hart	W	½Fl	132	Per	34x3	34x4	Lav	Mon	80
Royal	....	2800	Wis	4	3¾x5	22.5	.	..	..	C	T	...	Strm	Bosh	Opt	D	Own	.	Own	W	Timk	128	Mer	34x4	34x5	Ross	Mon	....
Sandow 1-1½	3700	2375	Cont	4	3½x5	19.6	3	5/32	L	T	T	FS	Strm	Eism	....	D	Full	3	K-B	W	Timk	138	Det	34x4	34x6	Ross	....	68
Schwartz	3500	2175	Cont	4	3¾x5	22.5	3	5/32	L	T	Fed	FS	Strm	Bosh	....	L	B-Li	3	Hart	I	Torb	140	....	34x3½	34x5	Ross	Pier	....
Signal H	4675	2700	Cont	4	4½x5¼	27.2	3	5/32	L	C	McC	FS	Strm	Eism	....	L	B-Li	4	Spic	W	Timk	144	Per	34x4	36x6	Ross	Pier	80
Stewart 9	3440	1975	Cont	4	3¾x5	22.5	3	5/32	L	T	T	FS	Zen	Eism	....	F	Full	3	Hart	Sp	Cl	140	Det	34x3½	34x4	Gem	Mon	80
Sullivan F	3500	2350	Buda	4	3¾x4½	22.5	3	5/32	L	T	V	Fo	Strm	Bosh	....	H	Covt	3	Hart	W	Timk	129	Mer	36x3½	36x5	Ross	....	68
Tiffin GW	3750	2125	Cont	4	3¾x5¼	22.5	3	5/32	L	C	V	FS	Rayf	Bosh	....	H	Covt	3	Hart	W	Timk	129	Mer	36x3½	36x5	Ross	Pier	80
Triangle A	3750	2185	Wau	4	3¾x5¼	22.5	3	..	L	C	Per	Sp	Strm	Eism	....	F	Full	3	UP	I	Cl	144	Det	34x3½	34x6	Gem	Wau	60
United AX	....	....	Buda	4	4¾x5½	22.5	4	..	L	C	V	Fo	....	Eism	Opt	L	B-Li	.	Bld	W	Shel	Opt	....	36x3½	36x6	Ross	Simp	80
Velie 25-B	4500	2950	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	T	FS	Strm	Bosh	....	B	B-Li	4	Spic	W	Timk	135	Math	36x4	36x7	Gem	Pier	80
White Hickory H	3975	2400	Cont	4	3¾x5	22.5	3	5/32	L	C	C	FS	Strm	Eism	....	F	Full	3	Arv	W	Timk	144	Shel	36x3½	36x5	Ross	Pier	76
Wichita L	3600	2350	Own	3	3½x5	19.6	4	..	L	T	Per	Sp	Strm	Bosh	....	C	Covt	3	Own	W	Shel	144	Det	36x3½	36x5	Ross	....	....
Wolverine C	3400	2250	Cont	4	3¾x5	22.5	..	..	L	T	L	FS	Strm	Opt	G&D	F	Selec	3	UP	I	Russ	140	Tut	34x3½	34x5	Gem	Mon	77
2 Ton																												
Acme A	4450	2750	Cont	4	4½x5¼	27.2	3	5/32	L	C	GO	FS	Rayf	Eism	....	B	Cott	3	Bld	W	Timk	148	Det	36x4	36x7	Ross	Dup	80
Acason H	4850	....	Wau	4	4¼x5¾	28.9	3	¼	L	C	Can	Sp	Sheb	Eism	....	M	Munc	4	Bld	W	Timk	150	Det	36x4	36x7	Ross	Wau	76
Armleder HW	4550	2900	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	T	Fo	Sheb	Bosh	....	D	B-Li	3	Opt	W	Timk	Opt	Math	36x4	36x7	Ross	Pier	....
Atterbury 7C	5260	2975	Cont	4	4⅛x5¼	27.2	3	¼	L	C	T	Sp	Zen	Eism	....	D	B-Li	4	Spic	W	Timk	153	SP	36x4	36x4D	Gem	Pier	92.5
Autocar F	3750	2025	Own	2	4¾x4½	18	4	5/32	L	C	V	Sp	Strm	Mag	....	D	Prog	3	....	DR	Flot	97	....	34x4	34x5	Own	....	....
Available H-2	4500	....	Cont	4	4¼x5½	27.2	3	5/32	L	C	T	Sp	Strm	Bosh	....	B	B-Li	4	Spic	W	Timk	118	Tut	36x4	36x7	Lav	Pier	....
Beck-Hawkeye C	4000	2150	Cont	4	4¼x5¼	....	..	..	..	P	H	Fo	Strm	Bosh	....	F	Full	3	Bld	I	½Fl	144	Hig	36x3½	36x6	Lav	Pier	70
Bessemer J	....	2490	Cont	4	4⅛x5¼	27.2	3	5/32	L	..	C	Sp	Rayf	Dix	....	B	B-Li	4	Arv	I	Torb	158	Per	36x4	36x4D	Ross	Pier	....
Brockway K-3	4700	2850	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	Bus	FS	Sheb	Eism	....	H	B-Li	3	Spic	W	Timk	Opt	Mer	36x4	36x7	Gem	Opt	70
Clydesdale 65	4850	....	Cont	4	4¼x5¼	27.2	3	5/32	L	C	T	Sp	Zen	Bosh	....	L	B-Li	4	Spic	W	Timk	163	Stan	36x4	36x4D	Ross	Own	73
Columbia E	4100	2350	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	L	Fo	Shk	Dix	....	H	Covt	3	Spic	I	Russ	144	Per	36x4	36x6	Own	Pier	80
Corbitt C	4850	3000	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	T	Sp	Strm	Eism	G&D	L	B-Li	3	....	W	Shel	148	Shel	36x4	36x7	Ross	Pier	80
Dart CC4	4785	2950	Buda	4	4¼x5½	28.9	4	¼	L	C	C	Fo	Zen	Eism	....	F	Full	4	Spic	W	Timk	150	Per	36x4	36x7	Ross	Simp	80
Day-Elder B	3300	2075	Cont	4	3¾x5	22.5	3	5/32	L	T	Bus	FS	Zen	Berl	....	B	Covt	3	Hart	W	Wis	144	IC	36x4	36x6	Ross	....	72
Dearborn B	2400	1280	GBS	4	3⅞x4¼	28.9	3	..	L	T	H	Sp	Strm	Dix	....	GB	GLee	3	Arv	Ch	C-C	127	C-C	32x4*	34x5	Dit	....	90
Defiance C	3500	1995	Cont	4	3¾x5	22.5	3	5/32	R	T	Per	FS	Strm	Eism	....	B	GLee	3	Arv	I	Torb	135	Det	34x3½	34x6	Dit	Mon	85
DeKalb E2	4150	2100	Cont	4	4¼x5¼	27.8	3	5/32	L	P	T	Fo	Mas	Eism	....	F	Full	3	K-B	W	Timk	146	Math	34x3½	36x4	Ross	....	68
Denby 13	3800	2350	Cont	4	3¾x5	22.5	3	5/32	R	T	Lng	Sp	Strm	Eism	....	D	Det	3	UP	I	Russ	144	Det	36x3½	36x6	Gem	Mon	75½
Diamond T-J3	4175	2925	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	T	FS	Strm	Bosh	....	L	B-Li	3	Spic	W	Timk	154	Math	36x4	36x7	Gem	Pier	....
Dorris K4	5200	2985	Own	4	4¼x5½	28.9	3	¼	I	C	T	Fo	Strm	Bosh	West	D	Warn	4	Spic	W	Timk	Opt	Row	36x4	36x7	Ross	Own	70
Fageol	4600	3300	Wau	4	4½x5¾	28.9	3	¼	L	C	Flex	Sp	Zen	Dix	....	B	Selec	4	Spic	W	Timk	144	Math	34x4	36x7	Ross	Wau	80
Fargo P	3900	2200	Cont	4	3¾x5	22.5	3	5/32	L	C	Own	Sp	Rayf	Bosh	....	D	Full	3	Spic	I	Russ	144	Shel	36x4	36x6	Jac	....	80
Federal U	4800	2600	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	T	Sp	Zen	Eism	....	B	Selec	4	Spic	W	Timk	156	Math	36x4	36x7	Gem	Mon	77
Gabriel E	5000	3250	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Fo	Rayf	Bosh	L-N	B	B-Li	4	Spic	W	Timk	156	Mer	36x4	36x7	Gem	Dup	65
Garford 70B	4590	3300	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Sp	Rayf	Spid	....	L	Selec	4	Spic	W	Timk	144	Per	36x4	36x7	Ross	Simp	....
Gary H	4000	....	Buda	4	4¼x5½	28.9	3	¼	L	P	T	C	Strm	Eism	....	F	Full	3	Hart	W	Shel	156	Tut	36x4	36x6	Lav	Simp	....
Giant 16	4500	2850	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	C	FS	Sheb	Eism	....	W	Warn	3	Spic	W	Timk	144	Math	36x4	36x7	Jac	....	90
G. M. C. 41A	4525	2725	Cont	4	4⅛x5¼	27.2	3	5/32	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	144	Det	36x4	36x4D	Lav	Mon	74
G. M. C. 41B	4580	2725	Cont	4	4⅛x5½	27.2	3	5/32	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	158	Det	36x4	36x4D	Lav	Mon	74
Grant 15	3400	2150	Cont	4	3¾x5	22.5	3	¼	L	T	Fed	FS	Cart	Dix	Remy	B	GLee	3	Arv	I	Torb	124	Per	34x4	34x6	Jac	Pier	65
Grant 16	3500	2250	Cont	4	3¾x5	22.5	3	¼	L	T	Fed	FS	Cart	Dix	Remy	B	GLee	3	Arv	I	Torb	140	Per	34x4	34x6	Jac	Pier	65
Hahn H	4800	1950	Cont	4	4⅛x5¼	30	3	5/32	L	P	Own	Fo	Strm	Mag	....	D	B-Li	3	Spic	I	Torb	136	Del	34x3½	34x6	Ross	Pier	....
Hahn E	5000	2500	Cont	4	4½x5½	40	4	¼	L	C	Own	Fo	Strm	Bosh	....	D	B-Li	3	Spic	W	Timk	Opt	Del	36x4	36x7	Ross	Pier	....
Hall	4000	2675	Cont	4	4⅛x5¼	27.2	..	..	L	P	H	FS	Zen	Bosh	....	L	B-Li	.	K-B	W	Timk	Opt	Det	36x4	36x4D	Gem	Dup	....
Hawkeye L	4000	2500	Buda	4	3¾x5½	22.5	3	5/32	L	C	C	FS	Zen	Eism	....	F	Full	4	Hart	I	Cl	148	Det	34x4	34x6	Gem	Simp	70
Hurlburt	5600	3500	Buda	4	4¼x5½	28.9	3	¼	..	C	T	FS	Fich	Eism	....	D	B-Li	3	Spic	W	Flot	148	....	36x4	36x4D	Ross	Dup	....
Independent C	4400	2290	Cont	4	4¼x5½	27.8	3	..	L	C	T	FS	Strm	Bosh	....	..	Full	3	Bld	I	Dead	146	Gar	34x4	34x6	Lav	....	70
International G	4010	2600	Own	4	4x5	25.6	4	¼	O	T	..	FS	Ens	Dix	Own	D	Own	3	Own	I	Own	135	....	36x4	36x6	Ross	Own	50
Jumbo B	4650	....	Buda	4	4¼x5½	28.9	3	¼	L	C	GO	Fo	Zen	Eism	....	F	Full	3	Arv	I	Cl	144	Det	36x4	36x7	Jac	Dup	60
Kelly-Spfd K 31	4590	2750	Own	4	3¾x5¼	22.5	3	¼	L	C	Fed	Fo	Zen	Eism	....	C	Covt	3	Spic	W	½Fl	144	Per	36x3½	36x6	Gem	Own	80
Kelly-Spfd K 32	4685	2750	Own	4	3⅞x5½	24.1	3	5/32	L	C	McC	Sp	Strm	Eism	....	D	Warn	3	Spic	W	Shel	152	Math	34x3½	34x5	Jac	Pier	80
Kissel	3500	2073	Own	4																								

Model a. c.	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr. Cent of Weight on Rear Wheels
2 Ton—Continued																												
Kissel	4500	2832	Own	4	4¼x5½	28.9	3	3/16	L	C	May	Sp	Strm	Eism	....	W	Warn	4	Spic	W	Timk	168	Math	34x4	36x7	Lav	Pier	80
Lane H	5230	2975	Cont	6	3½x5¼	29.7	3	¼	L	P	Hvn	FS	Strm	Eism	Dyn	B	Full	3	Acme	W	Timk	160	Kai	34x5	36x7	Ross	Pier	....
Luverne BBL	....	1650	GBS	4	3¾x4¼	....	3	5/16	L	T	C	Sp	Sheb	Bosh	Dyn	D	Det	3	UP	I	Flot	136	Har	34x4*	34x5	Lav	....	....
Mack AB	4900	3000	Own	4	4x5	25.6	3	..	L	C	H	FS	Strm	Dix	....	D	Selec	4	....	W	Dead	Opt	....	36x6	36x4D	....	Own	47
Manly	....	2350	Wau	4	3¾x5¼	22.5	3	¼	L	C	T	Sp	Zen	Eism	....	D	Selec	3	I	W	½Fl	144	Shel	36x4	36x5	Lav	Wau	....
Master M	4300	2390	Buda	4	4¼x5½	28.9	3	¼	L	C	T	FS	Mas	Eism	I	D	B-Li	4	Arv	I	Torb	144	Det	34x4	36x7	Wohl	McC	24
Master O	4400	2490	Buda	4	4¼x5½	28.9	3	¼	L	C	T	FS	Mas	Eism	I	D	B-Li	4	Arv	I	Torb	170	Det	34x4	36x7	Wohl	McC	24
Master W	4500	2590	Buda	4	4¼x5½	28.9	3	¼	L	C	T	FS	Mas	Eism	I	D	B-Li	4	Arv	W	Timk	144	Det	34x4	36x7	Wohl	McC	76
Master WL	4600	2690	Buda	4	4¼x5½	28.9	3	¼	L	C	T	FS	Mas	Eism	I	D	B-Li	4	Arv	W	Timk	170	Det	34x4	36x7	Wohl	McC	76
Menominee D	....	2950	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	T	FS	Strm	Eism	....	F	Selec	4	Spic	W	Timk	144	Tut	36x4	36x4D	Ross	Mon	80
Muskegon 20	4015	2325	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	May	FS	Stew	Eism	....	F	Full	3	Hart	I	Torb	144	Per	36x4	36x6	Lav	Pier	75
Nash 3018	3850	2175	Own	4	3¾x5¼	22.5	4	¼	L	C	T	Fo	Strm	Eism	Opt	B	Selec	3	Own	I	Celf	144	Stan	34x4	34x6	Jac	Simp	80
Nash Quad 4017	6250	3250	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Fo	Strm	Eism	Opt	B	I-Cl	4	Spic	F	Own	124	Math	36x5	36x5	Lav	Simp	55
Nels. & LeMoon F2	4100	2775	Cont	4	4¼x5¼	27.2	3	5/16	L	C	T	Sp	Strm	Bosh	W	L	B-Li	3	Own	W	Timk	Opt	Tut	36x4	36x7	Lav	Mon	80
Netco D	5900	3000	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	T	Sp	Zen	Eism	....	L	B-Li	3	Hart	W	Timk	144	Per	36x4	36x6	Ross	....	75
Northwestern W2	4900	2950	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	MR	Sp	Strm	Bosh	....	H	Selec	3	Bld	W	Shel	164	Shel	34x4	36x7	Ross	....	80
Ogden B1	3900	2695	Cont	4	4¼x5¼	27.2	3	5/16	L	C	T	FS	Rayf	Bosh	....	B	Selec	4	Acme	W	Timk	160	Tut	36x4	36x7	Gem	Pier	70
Oklahoma	4000	2650	Rut	4	4⅛x5½	27.2	3	5/16	L	C	T	FS	Cart	Dix	....	D	Selec	3	Hart	W	Stan	152	Tut	36x4	36x5	W	Pier	85
Oneida C	5440	3000	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	L	FS	Strm	Bosh	Opt	M	Cott	3	Spic	W	Timk	144	Math	36x4	36x7	Ross	Pier	82½
Oshkosh 4	4000	3500	H-Sp	4	3¼x5	16.9	3	5/16	L	T	C	FS	Zen	Bat	....	L	B-Li	4	Acme	B	Flot	130	Tut	36x6*	36x6*	Ross	....	60
Packard 2-E	5100	3400	Own	4	4x5½	25.6	3	¼	L	C	C	Fo	Own	Dix	Bij	D	Selec	4	Spic	W	Flot	144	SP	34x4	34x6D	Own	Own	48
Paige 50-18	5200	2950	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	T	FS	Strm	Bosh	....	D	Selec	4	Spic	W	Timk	150	Per	36x4	36x7	Jac	Pier	80
Parker	4500	3150	Cont	6	3½x5¼	29.4	3	¼	L	C	T	Sp	Strm	Dix	West	L	Own	3	Spic	W	Own	150	Tut	34x4	36x3½D	Ross	Pier	75
Pierce-Arrow	6250	3750	Own	4	4x5½	25.6	4	¼	T	C	T	Fo	Own	Eism	....	C	Selec	3	....	W	Flot	150	S-El	36x4	36x4D	....	Own	85
Rainier R-8	3900	2250	Cont	4	3¾x5	....	3	5/16	L	T	Har	FS	Zen	Sim	....	L	B-Li	4	Arv	I	Torb	144	Det	34x4	34x6	Lav	Mon	80
Republic 19	4450	2395	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	C	FS	Strm	Bosh	....	D	Full	3	Arv	I	Torb	144	Opt	Opt	Opt	Jac	Pharo	....
Rowe CDW	4500	3000	Wis	4	4x5	32	4	¼	L	C	May	Fo	Zen	Bosh	....	L	B-Li	4	Arv	W	Timk	142	Shel	34x4	36x4D	Ross	Simp	53
Royal	....	3200	Wis	4	4x6	25.6	..	..	..	C	T	..	Strm	Bosh	Opt	B	Own	.	Own	W	Timk	...	Mer	36x4½	36x6	Ross	Mon	....
Sandow Spl	3800	2650	Cont	4	3¾x5	22.5	3	5/16	L	P	T	FS	Strm	Eism	....	D	Full	3	K-B	W	Timk	150	Det	34x4	36x7	Whol	McC	24
Schacht	5500	3150	Buda	4	4¼x5½	28.9	3	¼	R	P	Own	Fo	Sheb	Bosh	....	H	Own	3	Hart	W	Own	Opt	Nat	36x4	36x7	Own	Dup	70
Schwartz	4000	2675	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	Fed	FS	Strm	Bosh	....	L	B-Li	3	Hart	I	Torb	146	....	36x4	36x7	Ross	Pier	....
Selden JWB	5000	3050	Cont	4	4⅛x5¼	27.2	3	5/16	L	P	Bus	Sp	Strm	Bosh	....	L	B-Li	4	Spic	W	Timk	150	Per	36x4	36x7	Jac	Pier	70
Selden JWBL	5050	3135	Cont	4	4⅛x5¼	27.2	3	5/16	L	P	Bus	Sp	Strm	Bosh	....	L	B-Li	4	Spic	W	Timk	162	Per	36x4	36x7	Jac	Pier	70
Selden JCB	4820	2850	Cont	4	4⅛x5¼	27.2	3	5/16	L	P	Bus	Sp	Strm	Bosh	....	L	B-Li	4	Spic	I	Russ	150	Per	36x4	36x7	Jac	Pier	70
Selden JCBL	4880	2935	Cont	4	4⅛x5¼	27.2	3	5/16	L	P	Bus	Sp	Strm	Bosh	....	L	B-Li	4	Spic	I	Russ	162	Per	36x4	36x7	Jac	Pier	70
Service 41	4900	3000	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Fo	Strm	Eism	....	D	Selec	4	Spic	W	Timk	160	....	36x4	36x7	Ross	Dup	70
Shaw	....	2750	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	T	FS	Zen	Bosh	....	L	B-Li	3	Spic	W	Timk	153	Per	36x4	36x6	Gem	....	75
Signal J	5200	3100	Cont	4	4¼x5¼	27.2	3	5/16	L	C	T	FS	Zen	Bosh	....	L	B-Li	4	Spic	W	Timk	150	Per	34x4	36x8	Ross	Pier	80
Standard 76	4380	2800	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	McC	FS	Strm	Eism	....	L	B-Li	4	Spic	W	Timk	140	....	36x4	36x6	Ross	....	70
Stewart 7	4460	2575	Cont	4	4⅛x5¼	27.2	3	5/16	L	P	T	FS	Zen	Eism	....	F	Full	3	Hart	I	IG	156	Det	34x4	34x4D	Ross	Pier	80
Sullivan E	4500	2850	Buda	4	4⅛x5½	27.2	3	¼	L	P	V	Fo	Strm	Bosh	....	L	B-Li	3	Bld	W	Timk	150	Shel	36x4	36x6	Ross	....	71
Tower F	4700	2975	Cont	4	4⅛x5¼	27.2	4	¼	L	C	T	Sp	Strm	Bosh	....	F	Full	3	Spic	W	Timk	146	Det	36x4	36x7	Ross	Pier	70
Traffic	3300	1395	Gray	4	3½x5	20	3	¼	O	T	C	Sp	Cart	King	....	B	Covt	3	Arv	I	Russ	133	Det	34x3½	34x5	Dit	....	75
Velie 25-B	4500	2950	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	T	FS	Strm	Bosh	....	B	B-Li	4	Spic	W	Timk	135	Math	36x4	36x7	Gem	Pier	80
Victor 2-L	4400	2800	Cont	4	4⅛x5¼	27.2	3	5/16	..	C	Own	FS	Strm	Bosh	....	L	B-Li	3	Ther	W	Timk	166	½Fl	36x4	36x6	Ross	Pier	....
Vim 22	4700	3150	Her	4	3¾x5⅛	22.5	4	5/16	L	C	T	FS	Zen	Dix	....	D	B-Li	4	Spic	W	Shel	142	Shel	36x4	36x6	Gem	Dup	....
Ward La France	5250	3350	....	4	4⅛x5¼	27.2	3	5/16	L	G	Own	Sp	Zen	Mag	....	B	Selec	4	....	W	Timk	154	....	36x4	36x7	Ross	Simp	....
White TBC	4150	3300	Own	4	3¾x5⅛	22.5	3	..	L	C	C	FS	Own	Mag	....	D	Selec	4	Own	B	½Fl	145	....	36x4	36x4D	Own	....	....
Wichita M	4700	2750	Wau	4	3¾x5¼	22.5	3	¼	L	C	Per	Sp	Strm	Bosh	....	C	Cont	3	Own	W	Shel	144	Det	36x4	36x7	Ross	Wau	....
Wilson	4500	2800	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	T	FS	Mar	Eism	....	C	Covt	3	K-B	W	Timk	144	Tut	36x4	36x7	Ross	Pier	80
Winther 48W	5300	2600	Wis	4	4x5	25.6	3	¼	L	P	T	G	Strm	Eism	Bij	F	Full	3	Arv	I	Cl	150	Math	36x4	36x4D	Ross	Dup	80
Winther 439	....	2100	Gray	4	3¼x5	....	3	¼	H	T	T	G	Strm	Eism	....	F	Full	3	Arv	I	Cl	132	Har	34x4	34x6	Lav	....	70
Witt Will	4550	2850	Cont	4	4⅛x5¼	27.2	3	5/16	L	G	C	FS	Zen	Eism	....	D	Selec	3	Spic	W	Timk	144	S-El	36x3½	36x7	....	Pier	67
2½ Ton																												
Bethlehem E	3950	2365	Own	4	4x4½	25.6	3	¼	L	T	Fed	FS	Sheb	Will	G&D	B	Det	3	UP	I	Russ	144	Shel	34x4	34x6	Lav	Mon	85
Brinton F	4600	3000	Cont	4	4⅛x5¼	27.2	3	5/16	L	T	T	Fo	Strm	Bosh	....	D	Selec	3	....	W	Flot	140	....	36x4	36x6	....	....	....
Concord B	4600	3000	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Sp	Zen	Eism	....	L	B-Li	3	Spic	W	Timk	150	Per	36x4	36x4D	Ross	Mon	70
Corbitt B	5000	3200	Cont	4	4⅛x5¼	27.2	3	5/16	L	C	T	FS	Strm	Eism	G&D	L	B-Li	4	....	W	Shel	148	Shel	36x4	36x7	Ross	Pier	75
Day-Elder	3650	2450	Cont	4	4⅛x5¼	27.2	3	5/16	L	P	Bus	FS	Zen	Berl	....	B	Covt	3	Hart	W	Wis	144	IC	36x6	Ross	....	....	72
DeKalb E 2½	4800	2600	Cont	4	4⅛x5¼	27.8	3	5/16	L	P	T	Fo	Mas	Eism	....	F	Full	3	K-B	W	Flot	144	Math	36x5	36x6	Ross	....	71
Gary HU	5000	....	Buda	4	4¼x5½	28.9	3	¼	L	P	T	C	Strm	Eism	....	F	Full	4	Hart	W	Shel	162	Tut	36x4	36x7	Lav	Simp	....
Gersix G	5200	3150	Buda	6	3½x5¼	29.3	3	5/16	L	C	I	Sp	Strm	Bosh	West	B	Cott	3	Bld	W	Own	150	Tut	36x4	36x7	Ross	Mon	75
Gramm-Bernst.	5210	3350	Wau	4	4¼x5¾	28.9	3	¼	L	C	T	Sp	Zen	Eism	....	D	Selec	3	Arv	W	Shel	156	....	36x4	36x4D	Ross	Wau	70
Harvey WFA	5300	3000	Buda	4	4¼x5½	22.5	4	¼	L	G	..	FS	Strm	Eism	....	B	B-Li	4	Spic	W	Shel	150	Shel	36x4	36x7	Ross	Dup	60
Jumbo A	4500	....	Buda	4	4¼x5½	28.9	3	¼	L	C	H	Fo	Zen	Eism	....	D	Full	3	Arv	I	Cl	168	Det	34x4	34x6	Jac	Dup	60
Kankakee E	3500	2265	Cont	6	3½x5¼	29.4	3	¼	L	C	H	FS	Zen	Will	Delc	U	Munc	3	Acme	I	Russ	147	Tem	34x4	34x6	Ross	....	70
Kelly-Spfd K35	5200	3250	Own	4	3¾x5¼	22.5	3	¼	L	C	Fed	Fo	Zen	Eism	...	C	Covt	3	Own	C	Dead	144	Per	36x4	36x4D	Gem	Own	89
Kelly-Spfd K36	5540	3250	Own	4	3¾x5¼	22.5	3	¼	L	C	Fed	Fo	Zen	Eism	....	C	Covt	3	Spic	W	½Fl	144	Per	36x4	36x4D	Gem	Own	89
Koehler L	3900	1985	Own	4	3½x5	19.6	3	5/16	L	T	V	FS	Strm	Eism	....	MM	MM	.	K-B	I	Torb	152	....	34x4	34x6	Own	Mon	65

Model a. c.	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr.Cent of Weight on Rear Wheels
2½ Ton—Continued																												
Larrabee-Deyo	4600	3000	Cont	4	4⅛x5¼	27.2	3	3/16	L	C	Bus	Sp	Strm	Bosh	....	L	B-Li	4	UM	W	Shel	154	Mer	36x4	36x7	Ross	Pier	....
Maccar H	5000	3300	Cont	4	4½x5½	32.4	3	3/16	L	C	Own	FS	Strm	Bosh	....	L	B-Li	3	Spic	..	Timk	162	Mer	36x4	36x4D	Ross	Pier	80
Manly	....	2800	Wau	4	4x5¾	25.6	3	1/4	L	C	T	Sp	Zen	Eism	....	D	Selec	4	Ther	W	½Fl	144	Shel	36x4	40x7	Lav	Wau	....
Moreland	5380	3400	Cont	4	4½x5½	32.4	3	3/16	L	C	C	Fo	Mill	Dix	....	D	Selec	4	Ther	W	Timk	Opt	US	36x4	36x7	Ross	....	....
Netco H	6500	3200	Cont	4	4½x5½	32.4	3	3/16	L	C	RT	Sp	Zen	Eism	....	L	B-Li	4	Hart	W	Timk	170	Per	36x4	36x7	Ross	....	75
Noble NW2	4660	2675	Cont	4	4⅛x5¼	27.2	3	3/16	L	C	H	FS	Rayf	Bosh	....	B	Full	4	Bld	W	Shel	148	Kal	36x4	36x7	Ross	Pier	80
Old Reliable	5750	3250	Wis	4	4 1/6x6	28.9	3	1/4	L	C	T	FS	Strm	Eism	....	D	Shel	3	Spic	W	Shel	160	Shel	34x4	36x4D	Ross	Mon	....
Panhard E	....	2350	Buda	6	4¼x5½	33.6	..	..	L	C	Per	Fo	Strm	Bosh	Opt	F	Full	3	UP	I	Torb	150	Det	34x4	36x6	Lav	Dup	....
Patriot	4600	3150	Cont	4	4¼x5¼	27.2	3	3/16	L	C	T	Fo	Strm	Bosh	....	D	Selec	4	Ther	H	W	156	S-El	34x4	34x7	W	Pier	80
Rock Falls	2800	1850	Buda	6	3½x5¼	29.4	3	3/16	L	P	H	FS	Rayf	Bosh	W	BB	GLee	3	Spic	SG	Flot	150	Tut	35x5*	35x5*	Gem	....	50
Rowe CDW	4600	3250	Wis	4	4x5	25.6	4	1/4	L	C	May	Fo	Zen	Bosh	....	L	B-Li	4	Arv	W	Timk	164	Shel	34x4	36x4D	Ross	Simp	61
Royal	....	3500	Wis	4	4¼x6	29.8	..	..	L	C	T	...	Strm	Bosh	Opt	B	Own	.	Own	W	Timk	132	Mer	36x4½	36x6	Ross	Mon	....
Sandow J	4500	2975	Cont	4	4⅛x5¼	27.2	3	3/16	L	P	T	FS	Strm	Bosh	....	D	B-Li	3	K-B	W	Timk	165	Det	36x4	36x7	Ross	Mon	70
Sanford 25	5400	3000	Cont	4	4⅛x4½	27.2	3	1/4	L	C	McC	Fo	Strm	Bosh	....	B	B-Li	3	Opt	W	Shel	Opt	Shel	36x4	36x4D	Ross	Pier	75
Schacht	5500	3150	Buda	4	4¼x5½	28.9	3	1/4	L	P	Own	Fo	Sheb	Bosh	....	H	Own	3	Hart	W	Own	Opt	Nat	36x4	36x7	Own	Dup	70
Schwartz	4000	2675	Cont	4	4⅛x5¼	27.2	3	3/16	L	C	Fed	FS	Strm	Bosh	....	L	B-Li	3	Hart	I	Torb	146	....	36x4	36x7	Ross	Pier	....
Sterling	5550	3300	Ster	4	4¼x5¾	28.9	3	1/4	L	C	Own	FS	Rayf	Eism	....	L	B-Li	3	Spic	W	Shel	156	Shel	36x4	36x4D	Ross	Wau	75
Tiffin MW	4890	2850	Cont	4	4⅛x5½	27.2	3	3/16	L	C	T	FS	Rayf	Bosh	....	D	Covt	3	Acme	W	Timk	148	Kal	36x4	36x3½D	Ross	Pier	80
Triangle B	4900	2850	Rut	4	4⅛x5½	27.3	3	..	L	C	Per	Fo	Strm	Eism	....	F	Full	4	UP	I	Celf	151	Det	36x4	36x7	Gem	Pier	60
Union B	4800	2375	Cont	4	4⅛x5½	27.2	3	1/4	L	P	T	Fo	Sheb	Eism	....	F	Full	4	UP	I	Russ	152	Math	36x4	36x7	Ross	Dup	70
United BX	....	....	Buda	4	4¼x5½	28.9	3	1/4	L	C	T	Fo	Strm	Eism	....	L	B-Li	4	Bld	W	Shel	Opt	....	36x4	36x7	Ross	Simp	80
U. S. H.	5200	3250	Cont	4	4⅛x5¼	27.2	3	3/16	L	C	T	Sp	Strm	Eism	....	H	B-Li	4	Opt	W	Shel	144	Shel	34x4	36x4D	Lav	Pier	80
Wichita	5200	2950	Wau	3	3¾x5¼	22.5	4	1/4	L	C	Per	Sp	Strm	Bosh	....	C	B-Li	4	Own	W	Shel	144	Det	36x4	36x7	Ross	Wau	....
Wilcox Q	4700	....	Own	4	4¼x5	28.9	3	1/4	L	C	T	Sp	Strm	Mag	....	W	Selec	4	Own	W	½Fl	135	Shel	36x4	36x3½D	Own	Pier	....
3 Ton																												
Denby 25	4500	3000	Cont	4	4⅛x5¼	27.2	3	3/16	R	C	L	FS	Strm	Eism	....	D	Full	4	UP	I	Russ	150	Det	36x4	36x7	Gem	Mon	79
F. W. D. B	6300	4500	Wis	4	4¾x5½	36.1	3	1/4	T	C	Lng	Fo	Strm	Eism	....	D	Cott	3	Opt	B	Flot	124	Tut	36x6	36x6	Ross	Pier	55
Manly 60	....	3350	Wau	4	4¼x5¾	29.8	3	1/4	L	C	T	Sp	Zen	Eism	....	D	Selec	4	Ther	W	½Fl	144	Shel	36x5	40x8	Lav	Wau	....
Oklahoma 3TS	4250	3250	Buda	4	4¼x5½	28.9	3	3/16	L	C	T	FS	Zen	Eism	....	D	Selec	4	Hart	W	Wis	158	Tut	36x4	36x7	Ross	Pier	85
Packard 3-E	7000	4100	Own	4	4½x5½	32.4	3	1/4	L	C	C	Fo	Own	Dix	Bij	D	Selec	4	Spic	W	Flot	156	SP	36x5	36x5	Own	Own	52
Parker	5300	3700	Cont	6	3½x5¼	29.4	3	1/4	L	C	T	Sp	Strm	Dix	....	D	Selec	3	Spic	W	Own	160	Tut	34x4	36x5D	Ross	Pier	75
Peerless TC	6900	4125	Own	4	4½x6½	32.4	3	3/16	T	G	T	Sp	Strm	Remy	....	C	Selec	4	Own	C	Dead	151	....	36x5	40x5	Own	Own	92
Rennoc M	5050	2895	Buda	4	4¼x5½	27.2	3	1/4	L	C	T	Fo	Strm	Spld	....	W	Warn	4	Hart	W	Wis	144	Row	36x5	36x7	Lay	Pier	65
Riker B	6900	4600	Own	4	4¼x6	28.9	5	1/4	T	C	T	FS	Own	Berl	West	O	Selec	4	Own	W	Own	150	Opt	36x5	36x5D	Ross	Own	75
Rowe GW	5500	4500	H-Sp	8	3¼x5	....	3	1/8	L	..	May	Fo	Zen	At-K	....	L	B-Li	4	M	W	Shel	170	Shel	38x7*	42x9*	Ross	....	55
Vim 23	6000	3950	Own	4	4¼x5½	28.9	5	3/16	L	C	T	FS	Zen	Dix	....	D	B-Li	4	Spic	W	Shel	175	Shel	36x4	36x4D	Gem	Dup	....
White TJ	7750	4100	Own	4	3¾x5¾	22.5	..	..	L	C	T	Fo	Own	Mag	....	D	Selec	4	Own	DR	Flot	171	....	36x5	40x5D	....	....	....
Winther 69	6400	3800	Wis	4	4x6	25.6	3	1/4	L	P	T	Fo	Mas	Eism	Bij	B	B-Li	4	Bld	I	Cl	150	Math	36x5	36x5D	Ross	Dup	85
3½ Ton																												
Acason L	6400	....	Wau	4	4¼x6¾	28.9	3	1/4	L	P	Can	Sp	Strm	Eism	....	M	Munc	4	Bld	W	Timk	172	Det	36x5	36x5D	Ross	Wau	76
Acme C	6500	3650	Cont	4	4½x5½	32.4	3	3/16	L	C	GO	FS	Rayf	Eism	....	B	Cott	3	Bld	W	Timk	168	Det	36x5	40x5D	Ross	Dup	80
Armleder KW	6600	3850	Cont	4	4½x5½	32.4	3	3/16	L	C	T	Fo	Sheb	Bosh	....	D	B-Li	3	Opt	W	Timk	156	Math	36x5	36x5D	Ross	Pier	60
Atterbury 7D	6910	3875	Cont	4	4½x5½	32.4	3	1/4	L	C	T	Sp	Zen	Eism	....	L	B-Li	4	Spic	W	Timk	167	SP	36x5	40x5D	Gem	Pier	92
Available 3	6400	....	Cont	4	4½x5½	32.8	3	3/16	L	C	T	Sp	Strm	Bosh	....	B	B-Li	4	Spic	W	Timk	168	Tut	36x5	40x5D	Lav	Pier	....
Bessemer K	....	3450	Cont	4	4½x5½	32.4	3	3/16	L	C	C	FS	Rayf	Dix	....	B	B-Li	4	....	I	Torb	175	Per	36x5	36x5D	Ross	Pier	....
Bethlehem F	4983	3465	Own	4	4⅜x6	30.6	4	1/4	L	P	Fed	FS	Sheb	Will	G&D	B	Det	3	UP	I	Russ	162	Shel	34x4	34x5D	Lav	Mon	85
Brockway R	6800	3750	Cont	4	4½x5½	32.4	3	3/16	L	C	Bus	FS	Sheb	Eism	....	L	B-Li	4	Spic	W	Timk	Opt	Mer	36x5	36x5D	Gem	Opt	70
Clydesdale 90	6600	....	Cont	4	4½x5½	32.4	3	3/16	L	C	T	Sp	Zen	Bosh	....	L	B-Li	4	Spic	W	Timk	170	Stan	36x5	40x5D	Ross	Own	78
Corbitt A	6780	4000	Cont	4	4½x5½	32.4	3	3/16	L	C	T	Sp	Strm	Eism	G&D	M	Cott	3	....	W	Shel	168	Shel	36x5	36x10	Ross	Pier	80
Couple Gear	9000	6000	Wis	4	5.1x5½	35	4	3/16	T	G	H	Fo	Strm	Eism	....	O	Own	75	....	B	Own	144	Tut	36x4D	36x4D	Own	....	55
Dart L	6740	4000	Buda	4	4½x6	32.5	3	1/4	L	C	C	Fo	Zen	Eism	....	W	Warn	4	Spic	W	Timk	160	Per	36x5	36x10	Ross	Simp	75
Day-Elder C	4600	2750	Buda	4	4¼x5½	28.9	3	1/4	L	C	Bus	FS	Zen	Berl	....	B	Covt	3	Hart	W	Wis	150	IC	36x4	36x7	Ross	Mon	72
Defiance D	6500	3500	Cont	4	4½x5½	32.4	3	3/16	L	P	Per	FS	Strm	Eism	....	B	Covt	3	Arv	I	Torb	164	Det	36x5	36x5D	Wol	Mon	85
Denby 27	6890	4150	Cont	4	4½x5½	32.4	3	3/16	L	C	L	FS	Strm	Eism	....	D	Warn	4	UP	I	Cl	170	Det	36x5	36x10	Ross	Simp	79
Diamond T-LB	6570	4150	Cont	4	4½x5½	32.4	3	3/16	L	C	T	FS	Strm	Bosh	....	L	B-Li	4	Spic	W	Timk	180	Math	36x5	36x5D	Gem	Pier	....
Duplex E	6050	4000	Buda	4	4¼x5½	28.9	3	1/4	O	C	L	FS	Sheb	Eism	....	L	B-Li	4	Bld	I	Own	130	Tut	36x6	36x6	Lav	Dup	60
Fageol	7300	4250	Wau	4	4¾x5¾	36.1	3	1/4	L	C	Flex	Sp	Zen	Dix	....	B	Selec	5	Spic	W	Timk	156	Math	36x5	36x5D	Ross	Wau	80
Federal W	7000	3350	Cont	4	4½x5½	32.4	3	3/16	L	C	T	Sp	Zen	Eism	....	B	Own	4	Spic	W	Timk	156	Math	36x5	36x5D	Gem	Mon	80
Garford 77C	7235	4300	Wis	4	4¾x5½	36.1	3	1/4	L	C	T	Sp	Rayf	Eism	....	L	Selec	4	Spic	W	Timk	128	Per	36x5	40x5D	Ross	Simp	79
Gary K	7000	....	Buda	4	4½x6	32.4	3	1/4	L	P	T	C	Strm	Eism	....	W	Warn	4	Bld	W	Shel	162	Tut	36x5	36x5D	Lav	Simp	....
Giant 17	6800	3850	Cont	4	4½x5½	32.4	3	3/16	L	C	C	FS	Strm	Eism	....	W	Warn	4	Spic	W	Timk	116	Det	36x5	36x5D	Ross	Pier	70
G. M. C. 71A	6985	3750	Cont	4	4½x5½	32.4	3	3/16	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	163	Det	36x5	40x5D	Lav	Mon	75
G. M. C. 71B	7100	3800	Cont	4	4½x5½	32.4	3	3/16	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	187	Det	36x5	40x5D	Lav	Mon	75
Gramm-Berns.	6790	4000	Wau	4	4½x5¾	32.4	3	1/4	L	C	T	Sp	Zen	Eism	....	D	Selec	4	Own	W	Shel	158	....	36x5	40x5D	Ross	Wau	70
Hahn F	7000	3250	Cont	4	4½x5½	32.4	4	1/4	L	C	Own	Fo	Strm	Bosh	....	B	B-Li	4	Spic	W	Timk	Opt	Del	36x5	36x5D	Ross	Pier	....
Hall	....	3500	Cont	4	4½x5½	32.4	3	1/4	L	P	L	FS	Zen	Bosh	....	L	B-Li	.	K-B	W	Timk	Opt	Det	36x5	36x5D	Gem	Dup	....
Harvey WHA	7700	3900	Buda	4	4½x6	32.4	4	1/4	L	P	..	FS	Strm	Eism	....	B	B-Li	4	Spic	W	Shel	160	Shel	36x5	36x5D	Ross	Dup	60
Hurlburt	6400	4250	Buda	4	4½x6	32.4	3	1/4	L	C	T	FS	Flch	Eism	....	D	B-Li	3	Spic	W	Flot	146	....	36x5	36x5D	Ross	Dup	....
Kelly-Spfd. K-40	8285	4250	Own	4	4½x6½	32.4	3	1/4	T	C	Fed	Fo	Rayf	Eism	....	C	Covt	3	Own	C	Dead	150	Per	36x5	40x5D	Gem	Own	93
Kissel	7600	3905	Own	4	4¼x5½	28.9	3	3/16	L	C	May	Sp	Strm	Eism	....	W	Warn	4	Spic	W	Shel	180	Shel	36x6	36x6D	Ross	Pier	75
Koehler M	4200	2965	....	4	4x5⅞	25.6	3	1/4	L	G	T	P	Strm	Eism	....	D	MM	4	K-B	I	Timk	162	....	36x4	36x7	Own	Simp	75

Model	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr. Cent of Weight on Rear Wheels
3½ Ton—Continued																												
Lane K	5870	3900	Cont	6	3¾x5¼	33.5	3	¼	L	P	Hvn	FS	Strm	Eism	Dyn	B	Full	3	Acme	W	Shel	160	Kal	36x5	36x5D	Ross	Pier	....
Larrabee-Deyo	6000	3950	Cont	4	4½x5½	32.4	3	5/16	L	C	Bus	Sp	Strm	Bosh	....	L	B-Li	4	UM	W	Shel	172	Mer	36x5	36x5D	Ross	Pier	....
Maccar M	6175	4100	Cont	4	4½x5½	32.4	3	5/16	L	C	Own	FS	Strm	Bosh	....	L	B-Li	3	Spic	..	Timk	174	Mer	36x5	36x5D	Ross	Pier	80
Mack AC	8070	4600	Own	4	5x6	40	2	..	L	C	T	FS	Strm	Dix	....	D	Selec	3	....	C	Dead	Opt	....	36x5	40x5D	....	Own	46
Master	6900	3890	Buda	4	4½x6	32.4	4	¼	L	C	T	FS	Mas	Eism	....	D	B-Li	4	Spic	W	Timk	158	Det	36x5	40x5	Lav	Pier	28
Menominee G	....	3880	Cont	4	4½x5½	32.4	3	5/16	L	C	T	FS	Strm	Eism	....	F	Full	4	Spic	W	Timk	160	Tut	36x5	36x6	Ross	Mon	80
Nelson&LeMonF3½	6000	3750	Cont	4	4½x5½	32.4	4	¼	L	C	T	Sp	Strm	Bosh	W	L	B-Li	4	Own	W	Timk	Opt	Tut	36x5	36x5D	Lav	Mon	80
Old Reliable	6650	4000	Wis	4	4¼x6	28.9	3	¼	L	C	T	FS	Rayf	Bosh	....	D	B-Li	4	Spic	W	Shel	140	Shel	34x5	36x5D	Ross	Mon	....
Oneida D	7270	3700	Cont	4	4½x5½	32.4	3	5/16	L	C	L	FS	Strm	Bosh	Opt	M	Cott	3	Spic	W	Timk	160	Math	36x5	36x5D	Ross	Pier	82½
Paige 51-18	7000	3950	Cont	4	4½x5½	32.4	3	5/16	L	C	T	FS	Strm	Bosh	....	D	Selec	4	Spic	W	Timk	160	Per	36x5	36x5D	Jac	Pier	80
Republic 20	6600	3450	Buda	4	4¼x5½	28.9	3	¼	L	C	Own	FS	Strm	Bosh	....	D	Full	4	K-B	I	Torb	165	Opt	Opt	Opt	Jac	Pharo	....
Rowe DEW	6520	3800	Wis	4	4x6	25.6	4	¼	L	C	May	Fo	Zen	Bosh	....	L	B-Li	4	M	W	Shel	156	Shel	36x5	36x5D	Ross	Simp	54
Sandow K	6500	3995	Cont	4	4½x5½	32.4	3	5/16	L	P	T	FS	Strm	Bosh	....	D	B-Li	3	K-B	W	Timk	175	Det	36x5	36x5D	Ross	Mon	71
Sanford 35	6900	3975	Cont	4	5¼x5½	34.4	3	¼	L	C	McC	Fo	Strm	Bosh	....	B	B-Li	3	Opt	W	Shel	174	Shel	36x5	36x5D	Ross	Pier	75
Schacht	6000	3500	Buda	4	4¼x5½	28.9	3	¼	L	P	Own	Fo	Sheb	Bosh	....	H	Selec	3	Hart	W	Own	156	Nat	36x4	36x4D	Own	Dup	70
Selden WL	6550	3850	Cont	4	4½x5½	32.4	3	5/16	L	P	Bus	Sp	Strm	Eism	....	L	B-Li	4	Spic	W	Timk	164	Per	36x5	36x5D	Ross	Pier	70
Service 71	6700	3900	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Fo	Strm	Eism	....	D	Selec	4	Spic	W	Timk	171	....	36x5	36x5D	Ross	Dup	70
Service 76	7100	4200	Buda	4	4½x6	32.4	3	¼	L	C	T	Fo	Strm	Eism	....	D	Selec	4	Spic	W	Timk	171	....	36x5	36x5D	Ross	Dup	70
Signal M	7300	4100	Cont	4	4½x5½	32.4	3	5/16	L	C	McC	FS	Strm	Eism	....	B	B-Li	4	Spic	W	Timk	168	Per	36x5	40x5D	Ross	Pier	80
Standard 66	6600	3675	Cont	4	4½x5½	32.4	3	5/16	L	C	T	FS	Strm	Eism	....	D	B-Li	4	Spic	W	Timk	160	....	36x5	36x5D	Gem	Mon	75
Sterling	8570	4325	Ster	4	4¼x6¾	28.9	3	¼	L	C	Own	FS	Rayf	Eism	....	M	Own	3	Opt	W	Timk	162	Math	36x5	40x5D	Ross	Wau	75
Stewart 11	6080	3500	Cont	4	4½x5½	32.5	3	5/16	L	P	..	FS	Zen	Eism	....	F	Full	4	Hart	I	IG	185	Det	36x5	36x5	Ross	Pier	80
Tiffin PW	6850	3760	Cont	4	4½x5½	32.4	3	5/16	L	C	T	Sp	Zen	Bat	Dyn	B	Covt	3	Acme	W	Shel	160	Kal	36x5	36x5D	Ross	Pier	80
Titan	7350	4300	Buda	4	4¼x6	32.4	3	¼	L	P	T	Fo	Strm	Eism	....	D	Cott	3	....	I	....	162	Math	36x5	40x5D	Lav	Simp	70
Tower G	6800	4100	Cont	4	4½x5½	32.4	4	¼	L	C	T	Sp	Strm	Bosh	....	F	Full	4	Spic	W	Timk	165	Det	36x5	36x5D	Ross	Pier	70
Twin Cy 4 Wh. DB	7200	4750	Wis	4	5½x6	42	3	..	T	C	H	FS	Strm	K-W	....	M	Cott	3	....	I	½Fl	140	....	....	....	Ross	Pier	60
United CX	....	....	Buda	4	4½x6	32.4	4	¼	L	C	..	Fo	Strm	Eism	Opt	L	B-Li	4	Bld	W	Shel	160	....	36x5	36x5D	Ross	Simp	80
U. S. D	7000	3950	Cont	4	4½x5½	32.4	3	5/16	L	C	T	Sp	Strm	Eism	....	H	Cott	3	Hart	W	Own	Opt	Tut	36x5	36x5D	Lav	Pier	80
Velie 26-B	6500	3900	Cont	4	4½x5½	32.4	3	5/16	L	C	T	FS	Strm	Bosh	....	B	B-Li	4	Spic	W	Timk	148	Math	36x5	36x5D	Gem	Pier	80
Victor M	6600	3800	Cont	4	4½x5½	32.4	3	5/16	..	C	Own	FS	Strm	Bosh	....	L	B-Li	4	Spic	W	Timk	176	½El	36x6	36x5D	Gem	....	....
Ward LaFrance 3A	5500	3750	....	4	4½x5½	32.4	3	¼	L	G	Own	Sp	Zen	Mag	....	..	Selec	4	Spic	W	Timk	170	....	36x5	36x5D	Ross	Simp	....
Wichita O	6500	3750	Wau	4	4½x5¾	32.4	3	¼	L	C	EM	Sp	Strm	Bosh	....	G	B-Li	4	Own	W	Shel	165	Det	36x5	36x5D	Ross	Wau	....
Wilcox P	6300	....	Own	4	4¼x5	28.9	3	¼	L	C	T	Sp	....	Bosh	....	C	Selec	4	Own	W	½Fl	139	Shel	36x5	36x5D	Own	Pier	....
Wilson G	6800	3800	Cont	4	4½x5½	32.4	3	5/16	L	C	T	FS	Strm	Eism	....	D	Covt	4	K-B	W	Timk	160	Tut	36x5	36x5D	Ross	Pier	80
4 Ton																												
Day-Elder F	5600	3350	Cont	4	4½x5½	32.4	3	5/16	R	P	Bus	FS	Zen	Berl	....	L	B-Li	4	Hart	W	Wis	165	IC	36x5	36x5D	Ross	Mon	76
Gabriel F	5800	4300	Buda	4	4½x6	38.9	3	¼	L	C	T	Fo	Rayf	Bosh	L-N	B	B-Li	4	Spic	W	Timk	180	Mer	36x5	40x5D	Gem	Dup	65
Kelly-Spfd.	8730	4400	Own	4	4½x6½	32.4	3	¼	T	C	Fed	Fo	Rayf	Eism	....	C	Covt	3	Own	C	Dead	150	Per	36x5	40x6D	Gem	Own	93
Moreland 19G	7810	4375	Cont	4	4¾x6	36.1	3	¼	L	C	C	FS	Mill	Dix	....	D	Selec	4	Ther	W	Timk	162	US	36x5	40x5D	Ross	Cont	....
Noble WW4	6540	3750	Cont	4	4½x5½	32.4	3	5/16	L	C	T	FS	Strm	Eism	....	B	Full	4	Acme	W	Shel	168	Kal	36x5	36x5D	Ross	Pier	80
Packard 4E	7460	4450	Own	4	4½x5½	32.4	3	¼	L	C	C	Fo	Own	Dix	Bij	D	Selec	4	Spic	W	Flot	156	SP	36x5	40x5	Own	Own	52
Parker	7100	4250	Cont	6	3¾x5½	33.7	3	¼	L	C	T	Sp	Strm	Dix	West	D	Selec	4	Spic	W	Own	160	Tut	36x5	40x5D	Ross	Pier	85
Peerless	7100	4150	Own	4	4½x6½	32.4	3	5/16	T	G	T	Sp	Strm	Remy	....	C	Selec	4	Own	C	Dead	161	....	36x5	40x5	Own	Own	92
Ricker	7200	4700	Own	4	4¼x6	28.9	5	¼	T	C	T	FS	B&B	Berl	West	C	Selec	4	Own	W	Own	Opt	Opt	36x5	36x6D	Ross	Own	77
Sanford 50	7400	4750	Cont	4	5¼x5½	34.4	3	¼	L	C	McC	Fo	Strm	Bosh	....	B	B-Li	3	Opt	W	Shel	174	Shel	36x5	40x6D	Ross	Pier	75
Union C	6600	3500	Wis	4	4¼x6	28.9	3	¼	L	P	T	Fo	Sheb	Eism	....	F	Full	4	UP	I	Torb	171	Math	36x6	36x10	Ross	Dup	75
Winther 88	7600	4200	Wis	4	4¼x6	28.9	3	¼	L	P	T	G	Mas	Eism	Bij	B	B-Li	4	Bld	I	Cl	156	Math	36x5	40x5D	Ross	Dup	80
4½ Ton																												
Winther 479	8900	4900	Wis	4	4¼x6	28.9	3	¼	L	P	T	G	Mas	Eism	Bij	B	Full	4	Bld	I	Cl	158	Math	36x5	36x5D	Ross	Dup	65
5 Ton																												
Acason M	8350	....	Wau	4	4¾x6¾	36.1	3	¼	L	P	Can	Sp	Sheb	Eism	....	B	Cott	3	Bld	W	Timk	187	Det	36x6	40x6D	Ross	Wau	77
Acme E	8800	4750	Cont	4	4¾x6	36.1	3	¼	L	C	GO	Fo	Rayf	Eism	....	B	Cott	3	Bld	W	Timk	180	Det	36x6	40x6D	Ross	Cont	80
Atterbury	9635	4975	Cont	4	4¾x6	36.1	3	¼	L	C	T	Fo	Zen	Eism	....	L	B-Li	4	Spic	W	Timk	167	SP	36x5	40x6D	Gem	Cont	84
Available 5	....	4900	Cont	4		32.8	3	5/16	L	C	T	Sp	Strm	Bosh	....	B	B-Li	3	Spic	W	Timk	168	Tut	36x6	40x6D	Ross	Pier	....
Brockway T	8800	4850	Cont	4	4¾x6	36.1	3	¼	L	C	Bus	Fo	Sheb	Eism	....	L	B-Li	4	Spic	W	Timk	172	Mer	36x5	36x5D	Gem	Dup	....
Clydesdale 120B	8500	....	Cont	4	4¾x6	36.1	3	¼	L	C	T	Fo	Strm	Eism	....	D	B-Li	4	Spic	W	Timk	Opt	Stan	36x5	40x6D	Ross	Own	76
Corbitt AA	8900	5000	Cont	4	5¼x5¾	41.1	3	5/16	T	C	T	FS	Strm	Eism	G&D	M	Cott	3	....	W	Shel	168	Shel	36x6	40x6	Ross	Pier	75
Couple Gear	11,000	6500	Wis	4	5¼x7	42	4	5/16	T	G	H	Fo	Strm	Eism	Own	..	Own	75	....	B	Own	144	Tut	36x5D	36x5D	Own	....	60
Day-Elder E	10,000	4500	Buda	4	4½x6	32.4	3	¼	L	C	Bus	Fo	Zen	Berl	....	L	B-Li	4	Hart	W	Shel	170	Shel	36x5	40x6D	Ross	Mon	73
Denby 210	8600	4900	Cont	4	4½x5½	32.4	3	5/16	L	C	L	FS	Strm	Eism	....	D	Warn	4	UP	I	Cl	170	Det	36x6	40x12	Ross	Simp	79
Diamond T-R	8300	4950	Cont	4	4½x5½	32.4	3	5/16	L	C	T	FS	Strm	Bosh	....	L	B-Li	4	Spic	W	Timk	170	Math	36x6	40x6D	Gem	Pier	....
Fageol	8300	5100	Wau	4	4¾x5¾	36.1	3	¼	L	C	Flex	Sp	Zen	Dix	....	B	Selec	5	Spic	W	Timk	156	Math	36x6	36x6D	Ross	Wau	80
Federal X	8100	4400	Cont	4	4½x5½	32.4	3	5/16	L	C	T	Sp	Zen	Eism	....	B	Own	4	Spic	W	Timk	156	Math	36x6	40x6D	Gem	Mon	80

Model	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr. Cent of Weight on Rear Wheels
a. c.																												
5 Ton—Continued																												
Garford 68	8870	5000	Wis	4	4¾x5½	36.1	3	¼	T	C	T	Sp	Rayf	Eism	....	L	Selec	4	Spic	C	Dead	128	Per	36x6	40x6D	Ross	Simp	....
G. M. C. 101-A	8000	4350	Cont	4	4½x5½	32.4	3	5/32	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	163	Det	36x6	40x6D	Lav	Mon	75
G. M. C. 101-B	8200	4400	Cont	4	4½x5½	32.4	3	5/32	L	C	McC	FS	Mar	Eism	....	D	Selec	4	UM	W	Timk	187	Det	36x6	40x6D	Lav	Mon	75
Gramm-Bernst.	8700	5000	Wau	4	4¾x6¾	36.1	3	¼	L	C	T	Sp	Zen	Eism	....	C	Selec	4	Own	W	Shel	168	....	36x6	40x6D	Ross	Wau	70
Hall	....	4500	Cont	4	4½x5½	32.4	..	..	L	P	L	FS	Zen	Bosh	....	L	B-Li	.	K-B	Ch	Timk	Opt	Per	36x4	40x6D	Gem	Dup	....
Harvey WKA	8900	5000	Buda	4	4½x6	32.4	4	¼	L	P	..	Fo	Strm	Eism	....	D	B-Li	3	Spic	W	Flot	156	....	36x5	40x6D	Ross	Dup	....
Hurlburt	7800	5250	Buda	4	4½x6	32.4	3	1/4	L	C	T	FS	Flch	Eism	....	C	Covt	3	Own	C	Dead	150	Per	36x6	40x6D	Gem	Own	93
Kelly-Springfield	9175	4900	Own	4	4½x6½	32.4	3	¼	T	C	Fed	Fo	Rayf	Eism	....	W	Warn	4	Spic	W	Shel	180	Shel	36x6	36x6D	Ross	Pier	75
Kissel	7600	....	Own	4	4¼x5½	28.9	3	5/32	L	C	May	Sp	Strm	Eism	....	MM	MM	3	K-B	I	Torb	152	Opt	34x4	34x6	Own	Mon	65
Koehler	3900	1985	Own	4	3¾x5	22.5	3	5/32	L	T	V	FS	Strm	Eism	....	L	B-Li	4	M	W	Shel	176	Mer	36x5	40x6D	Ross	Pier	....
Larrabee-Deyo	7900	4750	Cont	4	4½x5½	32.4	3	5/32	L	C	Bus	Sp	Strm	Bosh	....	D	B-Li	4	Spic	W	Timk	170	Det	36x6	40x6D	Lav	Pier	72
Master	8000	4890	Buda	4	4½x6	32.4	4	¼	L	C	T	FS	Mas	Eism	....	F	Selec	4	Spic	W	Timk	160	Tut	36x6	40x6D	Ross	Mon	80
Menominee	....	4950	Buda	4	4½x6	32.4	3	5/32	L	C	T	FS	Strm	Eism	....	D	Selec	4	Ther	W	Timk	192	US	36x6	40x6D	Ross	Cont	....
Moreland 19-J	9000	4725	Cont	4	4¾x6¾	36.1	3	1/4	L	C	Own	Fo	Mill	Dix	....	L	B-Li	4	Own	W	Timk	Opt	Tut	36x6	40x6D	Lav	Mon	80
Nels. & LeMoon F5	8000	4750	Buda	4	4½x6	32.4	4	1/4	L	C	T	Fo	Strm	Bosh	West	L	B-Li	4	Own	W	Timk	Opt	Tut	36x6	40x6D	Lav	Mon	80
Old Reliable	8200	5000	Opt	4	4¾x5½	36.1	3	5/32	T	C	I	FS	Strm	Bosh	....	D	Selec	3	Hart	C	Shel	126	S-El	36x6	36x6D	Ross	Opt	....
Old Reliable	8400	5000	Opt	4	5.1x5½	....	3	¼	T	C	L	FS	Strm	Bosh	Opt	M	Cott	3	Spic	W	Timk	170	Math	36x6	40x12	Ross	Pier	82½
Oneida E	9315	4750	Cont	4	5¼x5¾	44.1	3	5/32	L	C	L	FS	Strm	Bosh	Opt	D	Selec	4	Spic	W	Flot	156	SP	36x6	40x6	Own	Own	57
Packard 5-E	8650	5150	Own	4	5x5½	40	..	⅛	L	C	C	Fo	Own	Dix	Bij	D	Selec	4	Spic	W	Own	168	Tut	36x5	40x6D	Ross	Pier	85
Parker	9000	5000	Cont	6	3¾x5½	33.7	3	⅛	L	C	T	Sp	Strm	Dix	West	L	Selec	4	Spic	W	Own	168	Tut	36x6	40x6D	Ross	Pier	85
Peerless	8050	4700	Own	4	4½x6½	32.4	3	5/32	T	G	T	Sp	Strm	Remy	....	C	Selec	4	Own	C	Dead	161	....	36x6	40x6	Own	Own	92
Pierce-Arrow	7225	5500	Own	4	4⅞x6	38	4	⅛	T	P	T	Sp	Own	Bosh	....	C	Selec	3	Opt	C	Shel	168	S-El	36x5	40x6	....	Own	85
Rowe FW	8350	4900	Wis	4	4¾x5½	36.1	4	⅛	T	C	May	Fo	Zen	Bosh	....	L	B-Li	4	M	W	Shel	171	Shel	36x6	40x6	Ross	Simp	57
Royal	....	5000	Wis	4	4¾x5½	36.1	4	⅛	T	C	T	...	Strm	Bosh	Opt	..	Own	.	Own	W	Timk	168	Mer	36x6	40x6D	Ross	Mon	....
Sandow L	8450	4775	Cont	4	4¾x6	36.1	3	⅛	L	P	T	FS	Strm	Bosh	....	D	B-Li	4	K-B	W	Timk	163	Det	36x6	40x6D	Ross	Cont	71
Sanford 50	7400	4750	Cont	4	5¼x5½	34.4	3	⅛	L	C	McC	Fo	Strm	Bosh	....	B	B-Li	3	Opt	W	Shel	174	Shel	36x5	40x6D	Ross	Pier	75
Schacht	8000	4950	Buda	4	4¼x5½	28.9	3	⅛	L	P	Own	Fo	Sheb	Bosh	....	H	Own	3	Hart	W	Own	168	Nat	36x5	40x6D	....	Dup	70
Selden DL	8800	5000	Cont	4	4½x5½	32.4	3	5/32	L	P	Bus	FS	Strm	Eism	....	L	B-Li	4	Spic	W	Timk	170	Per	36x6	40x12	Ross	Pier	70
Service 101	8240	5000	Buda	4	4¾x6	36.1	3	⅛	L	C	T	Fo	Strm	Eism	....	D	Selec	4	Spic	W	Timk	171	....	36x6	36x6D	Ross	Dup	75
Signal R	8200	5100	Cont	4	4¾x6	36.1	3	⅛	L	C	McC	FS	Strm	Eism	....	B	B-Li	4	Spic	W	Timk	180	Per	36x6	40x6D	Ross	Bull	80
Standard 86	8000	4650	Cont	4	4½x5½	32.4	3	5/32	L	C	T	FS	Strm	Eism	....	D	B-Li	4	Spic	W	Timk	160	....	36x6	40x6D	Gem	Mon	75
Sterling	9500	5100	Ster	4	4¾x6¾	36.1	3	¼	L	C	C	FS	Rayf	Eism	....	M	Own	3	Opt	W	Timk	168	Math	36x6	40x6D	Ross	Wau	75
Tiffin	8400	5000	Cont	6	3¾x5¼	33.7	3	5/32	L	C	T	FS	Rayf	Bosh	West	D	Covt	3	Acme	W	Shel	168	Kal	36x6	40x6D	Ross	....	80
Titan	9100	5150	Buda	4	4½x6	32.4	3	⅛	L	P	T	Fo	Strm	Eism	....	D	Cott	3	....	I	C	156	Shel	36x6	40x6D	Lav	Simp	70
Twin Cy. 4Wh.Dr.A	9100	5250	Wis	4	5½x6	42	3	¼	T	C	H	FS	Strm	K-W	....	M	Cott	3	....	I	½Fl	140	....	....	....	Ross	Pier	60
United VX	8000	5250	Wis	4	4½x6	32.4	3	⅛	L	C	..	Fo	Strm	Eism	....	L	B-Li	4	Bld	W	Shel	160	....	36x5	40x6D	Ross	Simp	80
U. S. K	....	....	Buda	4	4¾x6¾	36.1	3	⅛	L	C	T	Sp	Strm	Eism	....	B	B-Li	4	Opt	W	Shel	156	Shel	36x5	40x6D	Lav	Wau	80
Vim 24	8500	....	Wau	4	4¼x5½	28.9	3	5/32	L	C	T	FS	Zen	Dix	....	D	B-Li	4	Spic	W	Shel	175	Shel	36x5	40x6D	Gem	Dup	....
Walter F	8500	....	Own	4	4¼x5½	28.9	5	5/32	L	C	T	FS	Zen	Dix	....	D	B-Li	4	Spic	W	Shel	175	Shel	36x5	40x6D	Gem	Dup	....
White T G	7500	5500	Own	4	4½x6½	32.4	3	5/32	..	G	Own	Fo	H-M	Eism	....	D	Selec	4	Own	I	Dead	140	Mer	40x6	40x10	Own	Own	65
Wichita Q	7925	5000	Own	4	4¼x5¾	28.9	..	..	L	C	T	Fo	Own	Mag	....	D	Selec	4	Own	B	Flot	174	....	36x6	40x6D	Own	....	....
Wilcox W	7300	4600	Wau	4	4½x5¾	32.4	3	⅛	L	C	EM	Sp	Strm	Bosh	....	C	B-Li	4	Own	W	Shel	165	Det	38x6	38x6D	Ross	Wau	....
Winther 109	9000	....	Wau	4	4¾x6¾	36.1	3	⅛	L	C	T	Sp	....	....	....	C	Selec	4	Spic	W	½Fl	162	Shel	36x5	40x12	Gem	....	...
Wilson H	7500	4600	Cont	4	4½x5½	32.4	3	5/32	L	C	T	FS	Strm	Eism	....	D	Covt	4	K-B	W	Timk	160	Tut	36x6	40x6D	Ross	Pier	80
	8300	5000	Wis	4	4¾x5½	36.1	3	¼	T	C	T	G	Mas	Eism	Bij	B	B-Li	4	Bld	I	Cl	162	Math	36x5	40x6D	Ross	Dup	80
5½, 6 and 7 Ton																												
Doane 1918	8500	5350	Wau	4	4¾x6¾	36.1	3	..	I	C	C	Sp	Mas	Bosh	....	D	Selec	3	D	Ch	Dead	178	....	36x6	40x6D	Lav	Wau	79
Hall	....	4500	Cont	4	4½x5½	32.4	..	..	L	P	L	FS	Zen	Bosh	....	..	B-Li	.	K-B	W	Timk	Opt	Det	36x5	40x6D	Gem	Dup	....
Koehler	5000	4200	....	4	4¼x5½	28.9	3	¼	L	G	T	Fo	Strm	Eism	....	D	MM	4	K-B	I	Timk	170	....	36x6	40x6D	Own	Simp	75
Maccar 5½	8000	5000	Wis	4	5.1x5½	41.5	3	¼	T	C	Own	...	Zen	Bosh	....	L	B-Li	4	Spic	W	Timk	186	Mer	36x5	40x6D	Ross	Pier	80
Mack 5½	8650	5250	Own	4	5x6	40	2	..	L	C	T	FS	Rayf	Bosh	....	C	Selec	4	Spic	W	Timk	105	Per	36x5	40x5D	Ross	Simp	50
Garford 6-ton	9350	5300	Wis	4	5.1x5½	41.5	3	¼	T	C	T	Sp	Rayf	Eism	....	L	Selec	4	Spic	C	Dead	128	Per	36x6	40x7D	Ross	Simp	....
Kelly-Springfield 6	9500	5200	Own	4	4½x6½	32.4	3	⅛	T	C	Fed	Fo	Rayf	Eism	....	C	Covt	3	Own	C	Dead	Opt	Per	36x6	40x7D	Gem	Own	93
Packard 6-E	8925	5400	Own	4	5x5½	40	..	⅛	L	C	C	Fo	Own	Dix	Bij	D	Selec	4	Spic	W	Flot	156	SP	36x6	40x7	Own	Own	57
Royal 6	....	5400	Wis	4	5½x6	42.2	..	..	..	C	T	...	Strm	Bosh	Opt	..	Own	.	Own	W	Timk	168	Mer	36x6	40x6D	Ross	Mon	....
Tiffin 6-ton	9000	5200	Cont	6	3¾x5¼	33.7	3	5/32	L	C	T	FS	Rayf	Bosh	West	D	Covt	3	Acme	W	Shel	168	Kal	36x6	40x12	Ross	....	80
Winther 149	9600	5500	Wis	4	5½x6	42	3	⅛	T	C	T	G	Mas	Eism	Bij	B	B-Li	4	Bld	I	Cl	162	Math	36x6	40x14	Ross	Dup	80
Couple Gear 6	11,000	7200	Wis	4	5¼x7	44.1	4	5/32	T	G	H	Fo	Strm	Eism	Own	..	Own	75	Own	On	Own	144	Tut	36x5D	36x6	Own	....	65
Mack 7	10,950	5500	Own	4	5x6	40	2	..	L	C	T	FS	Strm	Dix	....	D	Selec	3	....	C	Dead	Opt	....	36x7	40x7	....	Own	....
Old Reliable CP	10,240	6000	Wau	4	4¾x6¾	36.1	3	⅛	L	C	T	FS	Strm	Bosh	....	D	Selec	4	Spic	C	Shel	124	Shel	36x6	40x7D	Ross	Wau	....
Royal 7	....	....	Wis	4	5¼x7	44.2	.	..	..	C	T	...	Strm	Bosh	Opt	..	Own	.	....	W	Timk	168	Mer	36x7	40x7D	Ross	Mon	....

Gasoline Tractor-Trucks

Model	Chassis Weight	Chassis Price	Engine	No. of Cylinders	Bore and Stroke	Horse Power	Piston Rings Per Cylinder	Piston Ring Groove Width	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Ignition System	Engine Starter	Clutch Make or Type	Transmission	Speeds Forward	Universal	Drive	Rear Axle	Wheelbase	Springs	Front Tires	Rear Tires	Steering Gear	Governor	Pr.Cent of Weight on Rear Wheels
Columbia T	4000	2350	Cont	4	4⅛x5¼	27.2	3	3/16	L	C	T	Fo	Shk	Dix	....	C	Covt	3	Spic	I	Russ	112	Per	36x4	36x6	Own	Pier	80
Garford 70T	4750	3400	Buda	4	4¼x5½	28.9	3	¼	L	C	T	Sp	Rayf	Spld	....	L	Selec	4	Spic	W	Timk	116	Per	36x4	36x7	Ross	Simp	....
Garford 77T	6990	4400	Wis	4	4¾x5½	36.1	3	¼	T	C	T	FS	Rayf	Bosh	....	C	Selec	4	Spic	W	Timk	105	Per	36x5	40x5D	Ross	Simp	....
Garford 68T	8450	5100	Wis	4	5.1x5½	41.5	3	¼	T	C	T	FS	Strm	Eism	....	MM	Selec	4	Spic	W	Timk	102	Per	36x6	40x6D	Ross	Simp	....
Hood	2800	1400	Own	4	3¾x3¾	22.5	3	¼	T	T	C	Sp	Holl	....	....	D	Plan	2	Own	C	Own	60	Lah	20x3½	20x5	Own	....	65
Koehler 3-ton	3000	1750	Own	4	3½x5	19.6	3	3/16	O	T	T	FS	Strm	Eism	....	D	MM	3	K-B	..	Torb	106	Opt	34x3	34x5	Own	Mon	....
Koehler 5-ton	3900	2165	Own	4	3½x5	19.6	3	3/16	O	T	T	FS	Strm	Eism	....	D	MM	3	K-B	..	Torb	106	Opt	34x4	34x6	Own	Mon	....
Knox 35	8500	5500	Own	4	5x5½	40	4	¼	O	C	Fed	Fo	Zen	Mag	....	D	Selec	3	....	C	Timk	108	....	36x4	38x6D	Ross	....	....
Knox 36-3-ton	10,000	6000	Own	4	5x5½	40	4	¼	O	C	Fed	Fo	Zen	Mag	....	D	Selec	3	....	C	Timk	108	....	36x4	38x6D	Ross	....	....
Kuhn	9000	5000	Wis	4	4¼x5½	28.9	3	3/16	T	C	H	Sp	Rayf	Bosh	....	C	Selec	4	....	B	Own	138	....	36x7	36x7	....	....	55
Lapeer (3-ton)	3050	2100	Wau	4	3½x5¼	19.6	3	¼	L	P	..	FS	....	Mag	....	D	Selec	3	....	I	Torb	90	....	34x3½	34x5	....	....	....
Lapeer (5-ton)	3400	2600	Wau	4	4x5¾	25.6	..	..	L	P	..	FS	....	Mag	....	D	Selec	3	....	I	Torb	90	....	34x3½	34x3½D	....	....	....
Lombard	....	....	....	6	5½x6¾	....	..	..	..	C	..	Fo	....	....	....	D	....	.	....	W	....	...	....	.....	.....	....	....	90
Mack AB (5-ton)	4900	3000	Own	4	4x5	25.6	3	..	L	C	H	FS	Strm	Dix	....	D	Selec	4	....	C	Dead	120	....	36x4	36x4D	....	Own	47
Mack AC (7½-ton)	7670	4600	Own	4	5x6	40	2	..	L	C	H	FS	Strm	Dix	....	D	Selec	3	....	C	Dead	119	....	36x5	40x5D	....	Own	45
Mack AC (11-ton)	8250	5200	Own	4	5x6	40	2	..	L	C	H	FS	Strm	Dix	....	D	Selec	3	....	C	Dead	119	....	36x7	40x7D	....	Own	50
Mack AC (15-ton)	8650	5500	Own	4	5x6	40	2	..	L	C	H	FS	Strm	Dix	....	D	Selec	3	....	C	Dead	119	....	36x7	40x7D	....	Own	50
Rennoc 8-ton	5050	2850	Buda	4	4¼x5½	27.2	3	¼	L	C	T	Fo	Strm	Spld	....	D	Warn	4	Hart	W	Wis	116	Row	36x5	36x7	Lav	Pier	60
Ross E 3-ton	3800	1850	Own	4	4⅛x6	28.9	3	¼	L	P	T	Fo	....	Mag	....	C	Selec	3	Own	W	Own	144	Tut	....	....	Ross	Own	....
Walter 5-ton	8500	5500	Own	4	4½x6½	32.4	4	¼	L	C	T	Fo	Zen	Eism	West	W	Selec	4	Own	I	Dead	140	Math	40x6	40x6D	....	Own	60
Watson	6500	4050	Cont	4	4½x5½	32.4	4	3/16	L	C	Fed	FS	Zen	Bosh	....	L	B-Li	4	Spic	W	Timk	80	Shel	34x4	36x5D	Gem	Pier	37

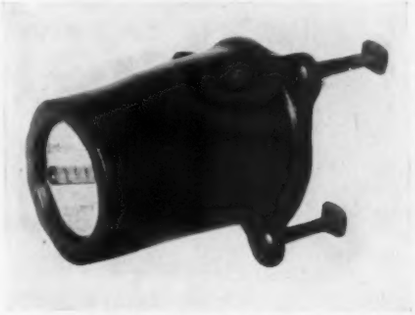
Electric Commercial Cars

E.C. Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent Weight on Rear Wheels
Ward WS	750	1400	....	12	Edis	45	West	West	4	B	Timk	Shel	32x3	32x3	Own	88	60
Commercial	1000	1800	2270	13	....	60	G-E	Own	4	Ct	Flot	.....	36x3	36x3	W	90	60
Walker	1000	2300	....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	93	66
Ward WA	1000	2730	....	12	Edis	47	G-E	G-E	4	W	Shel	Shel	32x3	32x4	Own	90	60
Commercial	2000	2500	2745	12	....	60	G-E	Own	4	Ct	Flot	.....	36x3½	36x4	W	100	..
Walker	2000	2500	....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
Ward WB	2000	3420	....	10	Edis	43	G-E	G-E	4	W	Shel	Shel	32x4	36x5	Own	102	60
Atlantic 2C	4000	5890	....	11	Exid	..	G-E	G-E	4	C	Timk	S-El	34x4	36x3D	Ross	115	..
Commercial	4000	3500	3270	10	....	60	G-E	Own	4	Ct	Flot	.....	36x4	36x4D	W	116	60
Walker	4000	3700	....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	110	66
Ward WD	4000	4500	....	8.5	Edis	35	G-E	G-E	4	W	Shel	Shel	36x5	36x7	Own	114	60
Atlantic 3C	7000	8000	....	10	Exid	..	G-E	G-E	5	C	Timk	.....	36x5	40x4D	Ross	124	..
Commercial	7000	5000	4595	9	....	50	G-E	Own	4	I	Dead	.....	36x3D	36x4D	W	122	55
Ward WF	7000	6600	....	7	Edis	30	G-E	G-E	4	W	Shel	Shel	36x6	40x10	Own	132	60
Atlantic 5C	10000	9500	....	7	Exid	..	G-E	G-E	5	C	Timk	S-El	36x6	40x5D	Ross	144	..
Couple Gear	10000	9000	5800	10	Phil	30	Own	Own	5	B	Own	Tut	36x5D	36x5D	Own	96	55
Couple Gear	14000	10000	4800	7	Phil	30	Own	Own	5	B	Timk	Tut	36x5D	36x5D	Own	96	75
Commercial	10000	6000	5240	7	....	50	G-E	Own	4	I	Shel	Tut	36x6	36x5D	W	132	55
Walker	10000	6300	....	10	Opt	50	West	West	5	O	Own	Math	36x5D	36x5D	Ross	144	66
Ward WH	10000	8375	....	6	Edis	26	G-E	G-E	4	W	Shel	Shel	36x7	40x12	Own	144	60
Couple-Gear	14000	12000	5400	7	Phil	30	Own	Own	5	B	Timk	Tut	36x5	38x7	Own	104	75
Couple-Gear	14000	10000	6500	10	Phil	30	Own	Own	5	B	Own	Tut	36x5D	36x5D	Own	96	55

TRUCK EQUIPMENT AND APPLIANCES

The Johns-Manville Hub Odometer

This useful device accurately records the cumulative mileage of pleasure or commercial cars up to 100,000 miles (forward or backward travel.) It is attached to the hub of the wheel in place of the



This Odometer is Made to Withstand Severe Service

ordinary hub cap and can be sealed, preventing tampering with the record.

It is made to withstand severe service and requires no attention after installation. It is about an inch longer than the regular hub cap and is similar to it in appearance.

The hub cap is substantially made of iron or brass in various sizes to fit any make of vehicle.

The odometer proper is made of brass, with wearing parts of hardened steel, cased in a brass cup which in turn is attached to the hub cap housing. It is practically grease-proof.

Convenience in attaching is one feature of the Johns-Manville Hub Odometer. The only machine work required is the drilling of a small hole in the axle or axle nut, as the odometer is driven by an arm which engages with a pin driven into the axle. In screwing the hub cap on the wheel there is no possibility of jamming the drive mechanism and it can be applied in a short time by any mechanic.

All hub odometers are made to practically duplicate the hub cap in appearance. The Johns-Manville Hub odometer for Ford cars, of malleable iron, sells for $12; brass $15. Prices for other cars range from $20 to $30.

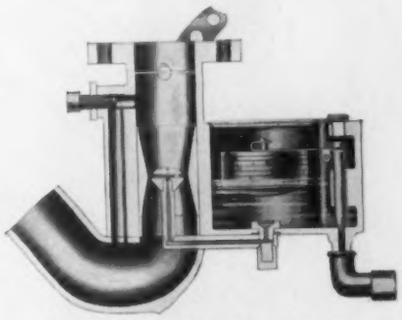
For standard types, especially quick deliveries can be made.

Automotive Supply Co. has been formed at Augusta, Ga., by A. B. Cheney. The company will conduct a wholesale jobbing and distributing business in automobile accessories and supplies.

Sunderman Announces Nitro Carburetor

The Sunderman Corp., of Newburgh, N. Y., has just announced a new carburetor under the trade name "Nitro." It is of the plain tube type, with floating venturi and mushroom spray nozzle, for compensating the air-gasoline ratio and thoroughly breaking up the mixture. At low and idling speeds the venturi rests upon its seat with its narrowest diameter opposite the mushroom jet, leaving a very small air passage with consequent high suction on the jet for starting and idling purposes. This suction can be moderated by the air bypass and its adjusting screw, which partly destroys the suction on the nozzle at lower speeds and prevents the venturi from rising too quickly.

As the throttle is opened and the vacuum in the carburetor increases, the venturi commences to rise on the air



The New Sunderman Carburetor

The venturi is shown seated. The air bypass at the left provides adjustment of the suction in the venturi, and regulates its position.

stream and draw away from the nozzle. This opens up the air passage around the nozzle, due to the taper walls of the venturi and compensates for correct ratios of air and gasoline. At higher speeds the venturi blocks the air bypass and puts it out of action. Then, under full suction, it quickly lifts to its highest position and gives the maximum air passage required by the engine for full volumetric efficiency. This venturi is a true stream line shape and is 98 per cent. efficient in offering no restriction to the free inflow of air while increasing the velocity at its narrow throat. At all times it automatically centers itself on the air stream around the nozzle and has ample clearance in the carburetor barrel for full freedom of motion.

The mushroom nozzle has a calibrated hole drilled in the end of the jet tube for the particular requirements of the engine upon which it is installed. The jet feeds into the mushroom head and out through four small holes, spreading the gasoline, by capillary action, in a thin fan film to all sides of the under surface of the slot. Here the ascending air picks it off at right angles to its path in a very fine

The nozzle works on the atomizer principle and is claimed to be very efficient in breaking up the fuel. This Nitro model has successfully handled kerosene and heavier fuels.

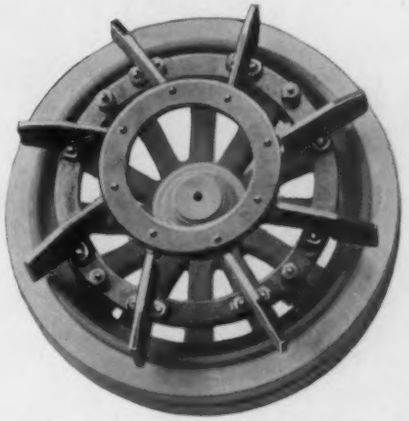
The Sunderman Corporation is also producing a special "de luxe" Ford outfit in aluminum, which has given remarkable results in over a year on the road.

The American Traction Ring for Trucks

The American Traction Ring is a device to help trucks over difficult roads and also over the roads that are covered with snow. It is simple in construction, and yet strong, and guaranteed against breakage. For a set of two the prices start at $35, the lowest price being for the Ford and other light cars. It is made of what is called near-steel.

The ring is attached to the outside of each driving wheel. In the truck type there are eight blades, commonly called paddles, set at an angle of 15 degrees, that the proper pressure may be exerted as they come into action below the hub line. The blades are fastened to an outside guard ring, in turn firmly fastened to the wheel by a ring on the inside of the wheel.

As the illustration shows, the blades do not touch the road or hard surfaces. But when the wheel sinks in the blades



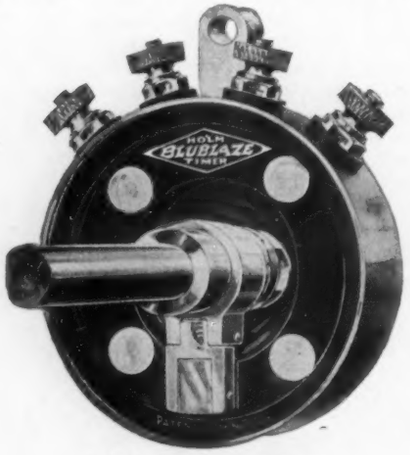
American Traction Ring for Trucks

come into action. They are very useful in traveling across the continent, or on dirt roads, and in regions where heavy snows lie on the ground for any length of time. They are made by the American Traction Ring Co., Inc., of White Plains, New York.

New Ford Timer

The Holm Blublaze Timer was exhibited at the New York show by the Dickson Sales Corp., of the Circle Building, 60th St. and Broadway, New York City, who are United States distributors for this timer.

A glance at the accompanying illustration will show how this timer varies in



The Holm Blublaze Timer

construction from the usual Ford timer. The contacts are made by a little block pinned to a yoke, which in turn is pinned to the shaft. A spring is used to make the contact. The maker claims that this construction facilitates starting and produces a smooth-running engine with no skipping on low throttle, and also that it will prevent short circuiting and twisting of the wires and that it requires no lubrication or attention.

The Hudson Timer Brush for Fords

The Hudson Motor Specialties Co., 1932 Arch St., Phila., Pa., has just announced a new part for Ford timers, in the form of a timer brush to replace the roller contact brush. Features of this device are its simplicity and positiveness of action.

The Hudson Timer Brush

This is a new brush developed especially for the Ford car and replaces the present equipment

This timer brush will not wear ridges in the contacts, in fact it has been proven that it will smooth out ridges which have been formed on the contacts. Cleanliness of contact points is assured by this brush which pushes aside the dirt or dust instead of rolling it down, and therefore will keep the entire circumference free and clear of everything except the oil that is necessary to prevent undue wear. The price is $.60.

Johnson M. C. D. Spark Plug

A new plug claimed to be non-breakable and having a removable core and an adjustable spark gap is being manufactured by the Johnson Spark Plug Co., of 611 Pierce St., Sioux City, Iowa. The core can be removed and cleaned without removing the shell from the engine and without necessitating resetting of the spark gaps. This spark gap is adjustable without bending a point, the lower electrode holder screwing up or down for adjustment.

The insulator on these plugs is pure India mica, which allows for expansion and contraction. The central electrode

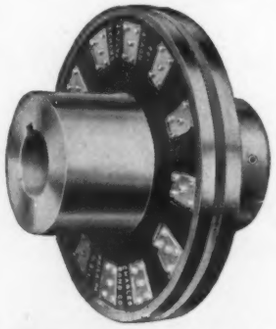
The Johnson M. C. D. Spark Plug

is wrapped, which tends to eliminate short circuit trouble. The electrodes of this plug are made of a good grade of heat resisting metal which is claimed not to burn or eat through, and is guaranteed against breakage.

The Grundy Flexible Couplings

A new flexible coupling is being manufactured by the Chas. Bond Co., 617 Arch St., Philadelphia. It is known as the Grundy Patent Flexible Insulated Coupling and consists of three pieces, the two outer flanges being of cast iron and the center disc of non-conducting material with lugs on each side for transmitting power to the outside flanges. It is featured by its durability and simplicity and is especially adapted for connecting pumps and machinery, fans, blowers, etc. It is also adaptable and effective for connecting the two ends of any shafting where it is difficult to get the bearings in perfect alignment.

This coupling can be either set-screwed or key-seated, or both if desired. It has no projections to cause damage. This device is perfectly balanced and maintains a positive and silent drive. It can be operated in either direction and is easily accessible. The central disc is



Grundy Patent Flexible Insulated Couplings

made of specially selected leather or hard fibre with the lugs securely cemented and riveted to each side of it. The larger sizes, Nos. 12 to 30, have lugs bolted on and reinforced with steel plate.

The J & B Timer for Ford Cars

The J & B Mfg. Co., of Pittsfield, Mass., is manufacturing its improved timer for the Ford car. The features of this timer are the Parker rust-proof finish, the thorough insulation and the arrangement for lubrication.

The rollers and bushings of this timer are pack hardened and ground to size. The roller does not revolve on the rivet pin. Instead, a hardened bushing is placed between the side members of the rotor, which is riveted in place by a soft pin and the roller revolves on the hardened bushing, the soft pin operating as a rivet only. The maker states that this construction eliminates the waves in the raceway of the timer housing.

The oil hole in the latter is of ample size to accommodate the spout of an oil can, allowing it to enter the housing

The J & B Timer

This is an approved type of timer, thoroughly insulated and with Parker rust-proof finish

completely, and the oil hole is protected from dirt and dust by a spring-hinged cover, located on the upper forward side of the timer housing. The outer end of the rotor arm is hinged and the roller at its end is pressed against the contact by the spring. The spring is made of very heavy music wire. The price of this timer is $1.40.

Kellogg Pumps for Large Pneumatics

Realizing that the use of the large sized pneumatics on motor trucks is increasing daily, the Kellogg Mfg. Co., of Rochester, N. Y., is paying particular attention to the manufacture of brackets which make it easy for any capable mechanic to install a Kellogg pump in short order. The company is also advocating what it terms its "standard" installation, by which the pump is attached to the transmission case, as illustrated by the accompanying diagram.

Kellogg Model 42, Heavy-Duty Engine Driven Tire Pump

This is the model recommended by the Kellogg Manufacturing Company for use on trucks equipped with the larger size pneumatics.

For the large sized pneumatics the Kellogg pump is made in two models; Model 24, single cylinder, and the Model 42, a two-cylinder outfit. By installing the pump on the transmission, the question of lubrication is taken care of automatically by the wick which leads from the pump case into the transmission, and as there is practically always a plentiful supply of oil in the latter, there is practically no chance of the pump running dry.

The bearings in the connecting-rod are Bound Brook oilless bearings, and require no lubrication. A hole is drilled into the crankcase of the pump just below the connecting-rod, which is used to drain off any accumulation of oil. The air inlet is at the side, and due to this construction, it is quite impossible for any water, mud or dirt to reach the intake valve and destroy its efficiency.

The Kellogg pumps are furnished complete with brackets, etc., for nearly twenty-five different well-known makes of trucks.

The Schaap Piston Ring

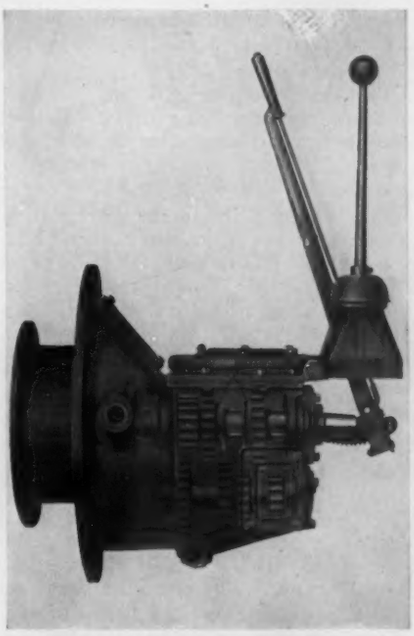
The Schaap Automobile Co., 344 Cumberland St., Brooklyn, N. Y., is marketing the Schaap piston ring. These rings are made from individual castings to obtain the rigidity of a close grained metal. The rings are heat treated in a furnace, making the metal of an equal density throughout and eliminating any possible chance of chill spots and unequal molecular strains. These rings are ground to size and do not require fitting or filing when being installed. The joints are carefully ground and are cut at an angle which will permit one end to ride over the other should an unusual heat condition arise, due to lack of oil or water. At the same time, the maker states, the joint of this ring will hold compression and act also as a suction pump, drawing excess oil from the cylinder. The maker also states that if a Schaap ring is placed below the wrist pin in which the cylinders are badly worn it will reduce or eliminate piston slap, because of the oil cushion formed by the oil drawn there by suction.

Schaap Piston Ring

The National Tool and Manufacturing Company Transmission and Clutch Set

The National Tool & Manufacturing Co., 2536 University St., St. Louis, Mo., is manufacturing in quantities the National transmission and clutch assembly. Noteworthy features of this product are the sensitive clutch action, the ease of gear shifting, and quiet operation at high speeds. All parts are made in the National company's plant, where machinery suited to each operation has been installed.

It also has a lubricating system which provides a continuous flow of oil from the transmission reservoir to each operating part, and an improved type of clutch brake, which operates automatically with the release of the clutch, permitting immediate and soundless shifting of gears. The clutches are multiple disk type. At the present time the National company is manufacturing a model 25 for 25 to 35-hp. engines, S. A. E. rating. The gears on this model are nickel steel, ¾-in. face, and shafts are of nickel steel with six splines.

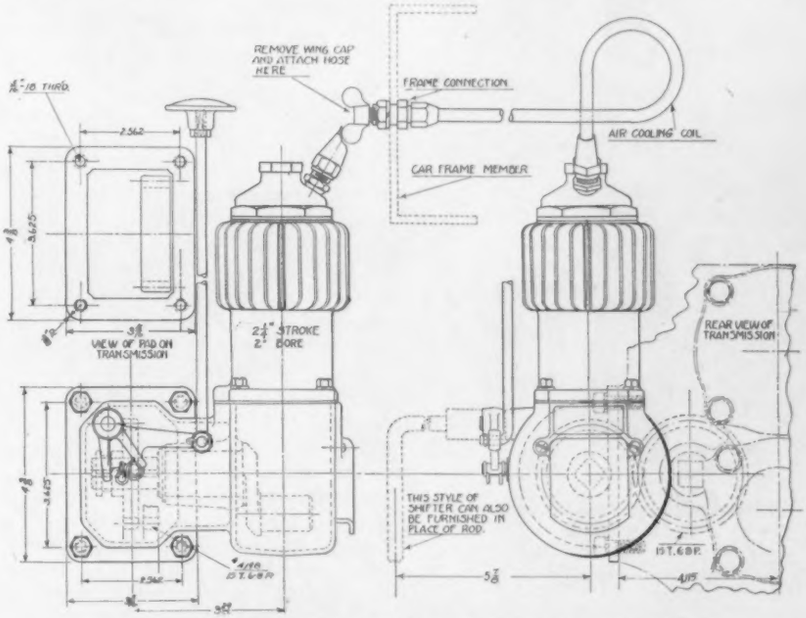


The National Transmission and Clutch

The clutch shaft is also of nickel steel and has S. K. F. ball bearings.

The speed reduction on low is 3.04:1; on 2nd, 1.81:1, and on high, 1:1; reverse is 3.7:1. The clutch has 12 plates.

Model 20 is for 18 to 25-hp. engines, and has the same general dimensions, except on the speed reduction, and the clutch has 8 plates.

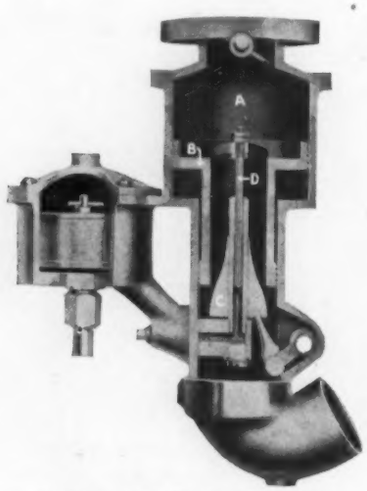

REMOVE WING CAP AND ATTACH HOSE HERE
FRAME CONNECTION
AIR COOLING COIL
CAR FRAME MEMBER
VIEW OF PAD ON TRANSMISSION
2¼" STROKE
2" BORE
REAR VIEW OF TRANSMISSION
THIS STYLE OF SHIFTER CAN ALSO BE FURNISHED IN PLACE OF ROD

Standard Installation of Model 241, Kellogg on Brown-Lipe Thirty Transmission and on the Covert

This pump is installed in a similar manner on the Detroit gear and machine transmission model CX and DX; on the Warner T-38-48; on the Fuller TU transmission, and several others

The Booty Carburetor

The Booty Carburetor Co., Westminster Bldg., Chicago, is manufacturing the Booty carburetor. The instrument is simple in construction, the proportion of air and gas being metered by the position of the control device which admits air around the cone and which operates the fuel valve also.



Section of the Booty Carburetor

The relation between throttle valve and piston B is shown in the accompanying illustration. Piston B rises just far enough to allow the area of opening around cone C to equal that of throttle valve.

The removable venturi prevents suction from reaching a high point. The low suction permits larger orifices in the metering pin and makes the carburetor self-cleaning.

The maker claims perfect proportion of air and gas throughout the whole range of the Booty carburetor, from no load to full load. This is accounted for by the relation of metering pin D with cone C and piston B. Both the volume of air and gas are controlled by piston B. The proportions of air and gas, required for perfect combustion, are determined by the shape of cone C and the depth of the tapered grooves in metering pin D, which are very shallow when piston B is in an idling position, but which increase in depth as the metering pin D is raised by piston B at the same time piston B is opening the venturi around cone C. Therefore the shape of cone C and the graduated depth of the tapered grooves in metering pin D, when calibrated correspond with one another, insuring perfect proportions of air and gas to the engine.

One of the most important functions of the Booty carburetor is that it automatically produces the required richer mixture for the engine on a quick getaway, but immediately and automatically comes back to perfect proportions of air and gas.

Perfect combustion throughout the entire range of a carburetor is most desirable, but in practice it is found that when an instantaneous load is thrown on an engine and the throttle valve is opened quickly, there is a starving condition, but with the Booty carburetor this is taken care of by an automatic action which is best understood by referring to the sectional view. When the throttle valve A is opened quickly, instead of the piston B rising instantly and admitting the proportion of air required for a perfect mixture, there is a partial vacuum created which has only a momentary action but causes the piston to lag for an instant. This reduces the air supply around cone C, at the same time increasing the suction on metering pin D.

To create a rich mixture for starting a cold engine the cone C can be raised so as to decrease the flow of air to a minimum if required.

To assure easy starting, the present construction of the nozzle differs from the one shown in the sectional view, there being a series of grooves milled in it which extend half way down from the top, so that when cone C is lifted, air is admitted through these grooves. It has been found that it has the action of a primer, the in-rush of air through the grooves in the nozzle carrying a very rich mixture to the engine.

Practically speaking, the float chamber is without adjustment and there is no actual requirement of gasoline level in the nozzle through which the gasoline passes to mixing chamber.

There are no ground joints in the Booty carburetor, and no wearing parts. It may be observed that the piston B has on its bearing surfaces a series of small grooves. These are always filled with gasoline vapor which acts as a lubricant.

The Holmes Grip for Truck With Dual Tires

The Holmes Grip for trucks, made by the Holmes Mfg. Co., of Shelton, Conn., is shown in the accompanying illustration. It consists of heavy cable with cross-members attached by "U" bolts. The maker claims that they will wear

The Holmes Grip Attached and an Enlarged View

the tires but little and save power by preventing slipping and insuring continuous service from the truck when the roads are in bad condition. They are attached to the drive wheels and are secured by two clamps. The retail price is from $34 upward per set.

The Shafer Roller Bearing

The George D. Bailey Co. is marketing a new front wheel bearing for Ford and Chevrolet 490's, under the name of the Shafer Roller Bearing. The design shows a departure from the general type of roller bearing. The outer surface of the inner cone is convex, having the contour of a perfect ball and the rollers have a concave surface, thereby forming a cradle for the cone and allowing it to swing to meet any deflection of the spindle when same gets out of alignment. The cone being free to move with the spindle and the load being taken upon the full length of the rollers prevents strain or binding of the bearing.

New Shafer Roller Thrust Bearing

This bearing is especially for the front wheels of Ford and Chevrolet 490's. It is known as the Shafer roller bearing.

The concave surface of the rollers at all times presents an equal load-carrying surface, from the side as well as the top, and therefore the bearing is able to accept thrust (sideway) loads as well as radial (downward) loads. The highest grade chrome nickel alloy steel is used throughout.

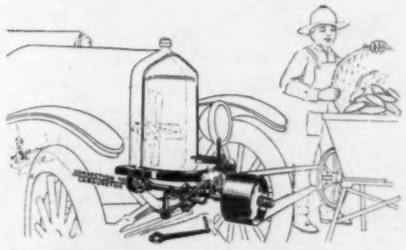
Glarekiller and Rear View Mirror Combined

The American Glarekiller Corp., of 901 Crozer Bldg., Philadelphia, is introducing a neat combination of rear view mirror and glarekiller. This new equipment for the car consists of a tubular arm, having mounted at one end the mirror adjustable to any position, and at the other end the Glarekiller. This latter is concave in form and dims the glare of the lights on an approaching car. The Glarekiller can be swung into any position desired and need only be swung before the driver's eyes when approaching a car with a blinding headlight.

The mirror is French plate glass, and all the metal parts of this device are baked in black enamel, including the tubing and the clamp. The latter is a swivel clamp permitting the arm to be raised or lowered. A different type of clamp comes for either the round, square or oval windshield frame. The retail price of this device complete is $6, although it can be had without the mirror for $3.50.

The Wizard Power Transmitter

A new device to transmit the power of motor car engines by means of a belt for operating various pieces of light machinery has been introduced by the Auto Power & Malleable Mfg. Co., First National Bank Bldg., Omaha, Nebr. It is a device to be fitted to the front of a



The Wizard Transmitter
This device permits using the power of cars for operating various devices, by means of a belt

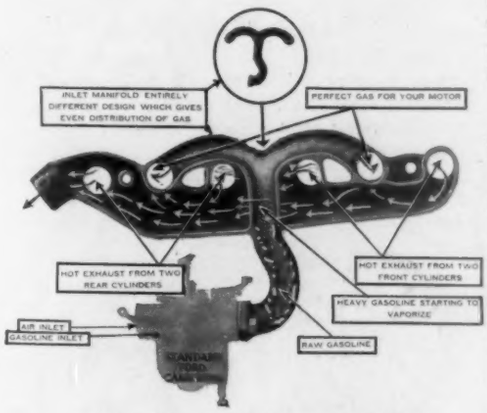
Ford car and detached or attached as desired. After removing the crank handle and bushing from the Ford car, the transmitter shaft (which couples to the engine shaft) is inserted, and the frame of the device is then bolted to the car at four points, and the throttle rod attached. It is unnecessary to bore holes or make changes in the car, and the device can be detached without much trouble.

The model illustrated is for the Ford car or truck, although this device is manufactured for various cars and trucks at $5 additional. The price of the Ford model is $57.50, f.o.b. Omaha.

This device has a cone clutch control and a ball throttle governor. It weighs about 50 lb.

The Reeves Manifold

A new manifold for Ford cars is being marketed by W. G. Reeves, of Stockbridge, Mich. This manifold replaces the


INLET MANIFOLD ENTIRELY DIFFERENT DESIGN WHICH GIVES EVEN DISTRIBUTION OF GAS
PERFECT GAS FOR YOUR MOTOR
HOT EXHAUST FROM TWO REAR CYLINDERS
HOT EXHAUST FROM TWO FRONT CYLINDERS
HEAVY GASOLINE STARTING TO VAPORIZE
AIR INLET
GASOLINE INLET
RAW GASOLINE

Section View of the Reeves Manifold

present Ford inlet and exhaust and is stated to produce a saving of 25 to 50 per cent. in gasoline and in addition to eliminate plug trouble and permit the engine to be throttled to a lower speed.

It is of a unique design and will distribute the gas evenly. It also permits the use of from ½ to 1-3 kerosene. The accompanying illustration shows course of the inlet and exhaust gases.

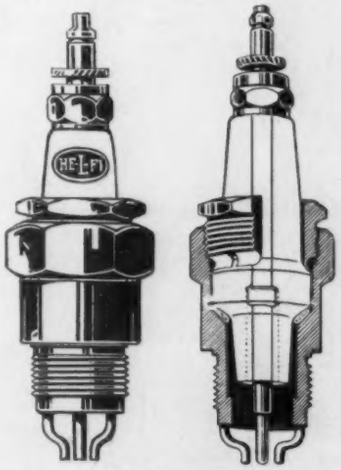
The price of this device is $9; west of the Rockies, $10.

The Hel-fi Spark Plug

The features of the Hel-Fi spark plug, manufactured by the Hel-Fi Company, 424 Meridian St., Indianapolis, Ind., are the parallel electrodes and the spring gland construction.

The electrodes extend into the combustion chamber. This construction the maker states, produces more perfect and instantaneous combustion, as well as easy starting.

The spring gland feature is shown in the cut-a-way view, which is designed to prevent breaking of the porcelain and at the same time stop the compression leakage. Spring Verona washers and copper asbestos gaskets are used to insure constant alignment and compact-



The Hel-fi Plug
This spark plug is shown herewith in the external view and also with a section cut away, disclosing the internal spring gland.

ness without rigidity, also to take care of the contraction and expansion of the parts. Prices are $1.25 for the Duplex plug and $1 for the Standard.

The New Cantello Carburetor

The Automotive Supply Corporation, 1776 Broadway, New York City, is marketing the Cantello carburetor, a new instrument especially designed to handle the variety of low grade fuels now on the market, and to meet variations in temperature and altitude conditions. The floating valve, in this carburetor, instead of being of a predetermined weight and being lifted by the suction of the engine, is extremely light in weight and is drawn downward by the vacuum operating on the under side of the valve through the venturi section. The acceleration and flexibility of this instrument are due to the construction of the dashpot and to the design of the metering pin in relation to the cone-shaped air valve.

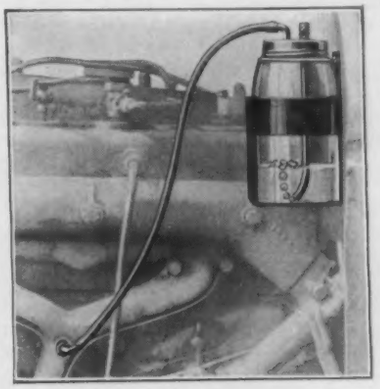
When idling, the primary air travels through the same ports used for gasoline when the throttle is in any running position, but in the reverse direction, the gasoline being supplied through the main jet. It has two adjustments, one for idl-

The New Cantello Carburetor

ing and the other for speed. The carburetor sells for from $20 to $40, made in 1-in. to 2-in. sizes.

The Workrite Carbon Remover and Gasoline Saver

This device is designed to mix a small amount of water vapor with the gas vapor in the intake manifold, to improve combustion and remove carbon. It consists of a metal frame for holding a glass jar, in the cap of which there is an adjustable inlet valve to regulate the amount of air passing down through the tube. From the end of this tube the air bubbles up through the water and is drawn out the pipe from the top of the jar. The connection from the elbow, in the top of the jar, is by a rubber tube,

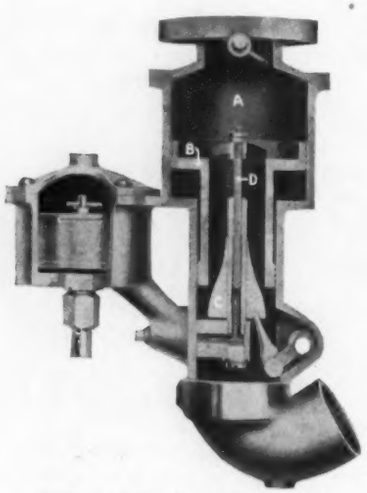


Workrite Carbon Remover
This is a humidifier and the maker claims it will remove carbon and save fuel

which extends to the ⅛-in. pipe thread connection which is screwed into the intake manifold. This device sells for $1.75, and is made by The Workrite Manufacturing Co., 5606 Euclid Ave., Cleveland, Ohio.

The Booty Carburetor

The Booty Carburetor Co., Westminster Bldg., Chicago, is manufacturing the Booty carburetor. The instrument is simple in construction, the proportion of air and gas being metered by the position of the control device which admits air around the cone and which operates the fuel valve also.



Section of the Booty Carburetor

The relation between throttle valve and piston B is shown in the accompanying illustration. Piston B rises just far enough to allow the area of opening around cone C to equal that of throttle valve.

The removable venturi prevents suction from reaching a high point. The low suction permits larger orifices in the metering pin and makes the carburetor self-cleaning.

The maker claims perfect proportion of air and gas throughout the whole range of the Booty carburetor, from no load to full load. This is accounted for by the relation of metering pin D with cone C and piston B. Both the volume of air and gas are controlled by piston B. The proportions of air and gas, required for perfect combustion, are determined by the shape of cone C and the depth of the tapered grooves in metering pin D, which are very shallow when piston B is in an idling position, but which increase in depth as the metering pin D is raised by piston B at the same time piston B is opening the venturi around cone C. Therefore the shape of cone C and the graduated depth of the tapered grooves in metering pin D, when calibrated correspond with one another, insuring perfect proportions of air and gas to the engine.

One of the most important functions of the Booty carburetor is that it automatically produces the required richer mixture for the engine on a quick getaway, but immediately and automatically comes back to perfect proportions of air and gas.

Perfect combustion throughout the entire range of a carburetor is most desirable, but in practice it is found that when an instantaneous load is thrown on an engine and the throttle valve is opened quickly, there is a starving condition, but with the Booty carburetor this is taken care of by an automatic action which is best understood by referring to the sectional view. When the throttle valve A is opened quickly, instead of the piston B rising instantly and admitting the proportion of air required for a perfect mixture, there is a partial vacuum created which has only a momentary action but causes the piston to lag for an instant. This reduces the air supply around cone C, at the same time increasing the suction on metering pin D.

To create a rich mixture for starting a cold engine the cone C can be raised so as to decrease the flow of air to a minimum if required.

To assure easy starting, the present construction of the nozzle differs from the one shown in the sectional view, there being a series of grooves milled in it which extend half way down from the top, so that when cone C is lifted, air is admitted through these grooves. It has been found that it has the action of a primer, the in-rush of air through the grooves in the nozzle carrying a very rich mixture to the engine.

Practically speaking, the float chamber is without adjustment and there is no actual requirement of gasoline level in the nozzle through which the gasoline passes to mixing chamber.

There are no ground joints in the Booty carburetor, and no wearing parts. It may be observed that the piston B has on its bearing surfaces a series of small grooves. These are always filled with gasoline vapor which acts as a lubricant.

The Holmes Grip for Truck With Dual Tires

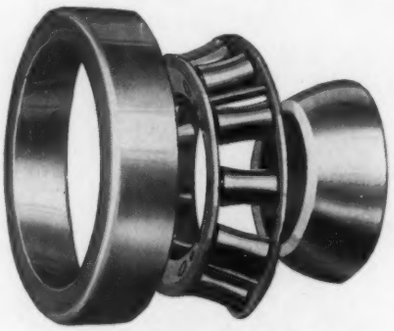
The Holmes Grip for trucks, made by the Holmes Mfg. Co., of Shelton, Conn., is shown in the accompanying illustration. It consists of heavy cable with cross-members attached by "U" bolts. The maker claims that they will wear

The Holmes Grip Attached and an Enlarged View

the tires but little and save power by preventing slipping and insuring continuous service from the truck when the roads are in bad condition. They are attached to the drive wheels and are secured by two clamps. The retail price is from $34 upward per set.

The Shafer Roller Bearing

The George D. Bailey Co. is marketing a new front wheel bearing for Ford and Chevrolet 490's, under the name of the Shafer Roller Bearing. The design shows a departure from the general type of roller bearing. The outer surface of the inner cone is convex, having the contour of a perfect ball and the rollers have a concave surface, thereby forming a cradle for the cone and allowing it to swing to meet any deflection of the spindle when same gets out of alignment. The cone being free to move with the spindle and the load being taken upon the full length of the rollers prevents strain or binding of the bearing.



New Shafer Roller Thrust Bearing

This bearing is especially for the front wheels of Ford and Chevrolet 490's. It is known as the Shafer roller bearing.

The concave surface of the rollers at all times presents an equal load-carrying surface, from the side as well as the top, and therefore the bearing is able to accept thrust (sideway) loads as well as radial (downward) loads. The highest grade chrome nickel alloy steel is used throughout.

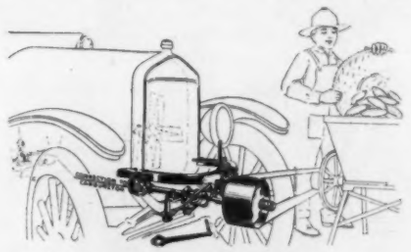
Glarekiller and Rear View Mirror Combined

The American Glarekiller Corp., of 901 Crozer Bldg., Philadelphia, is introducing a neat combination of rear view mirror and glarekiller. This new equipment for the car consists of a tubular arm, having mounted at one end the mirror adjustable to any position, and at the other end the Glarekiller. This latter is concave in form and dims the glare of the lights on an approaching car. The Glarekiller can be swung into any position desired and need only be swung before the driver's eyes when approaching a car with a blinding headlight.

The mirror is French plate glass, and all the metal parts of this device are baked in black enamel, including the tubing and the clamp. The latter is a swivel clamp permitting the arm to be raised or lowered. A different type of clamp comes for either the round, square or oval windshield frame. The retail price of this device complete is $6, although it can be had without the mirror for $3.50.

The Wizard Power Transmitter

A new device to transmit the power of motor car engines by means of a belt for operating various pieces of light machinery has been introduced by the Auto Power & Malleable Mfg. Co., First National Bank Bldg., Omaha, Nebr. It is a device to be fitted to the front of a



The Wizard Transmitter
This device permits using the power of cars for operating various devices, by means of a belt

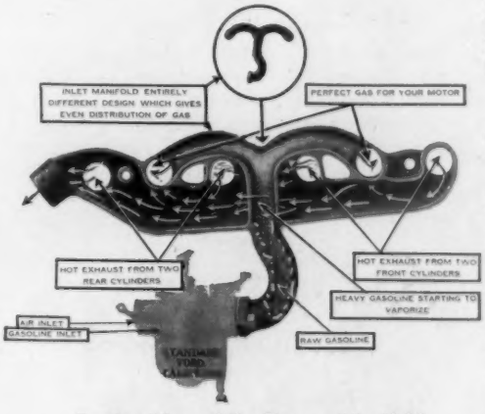
Ford car and detached or attached as desired. After removing the crank handle and bushing from the Ford car, the transmitter shaft (which couples to the engine shaft) is inserted, and the frame of the device is then bolted to the car at four points, and the throttle rod attached. It is unnecessary to bore holes or make changes in the car, and the device can be detached without much trouble.

The model illustrated is for the Ford car or truck, although this device is manufactured for various cars and trucks at $5 additional. The price of the Ford model is $57.50, f.o.b. Omaha.

This device has a cone clutch control and a ball throttle governor. It weighs about 50 lb.

The Reeves Manifold

A new manifold for Ford cars is being marketed by W. G. Reeves, of Stockbridge, Mich. This manifold replaces the


INLET MANIFOLD ENTIRELY DIFFERENT DESIGN WHICH GIVES EVEN DISTRIBUTION OF GAS
PERFECT GAS FOR YOUR MOTOR
HOT EXHAUST FROM TWO REAR CYLINDERS
HOT EXHAUST FROM TWO FRONT CYLINDERS
HEAVY GASOLINE STARTING TO VAPORIZE
AIR INLET
GASOLINE INLET
RAW GASOLINE

Section View of the Reeves Manifold

present Ford inlet and exhaust and is stated to produce a saving of 25 to 50 per cent. in gasoline and in addition to eliminate plug trouble and permit the engine to be throttled to a lower speed.

It is of a unique design and will distribute the gas evenly. It also permits the use of from ½ to 1-3 kerosene. The accompanying illustration shows course of the inlet and exhaust gases.

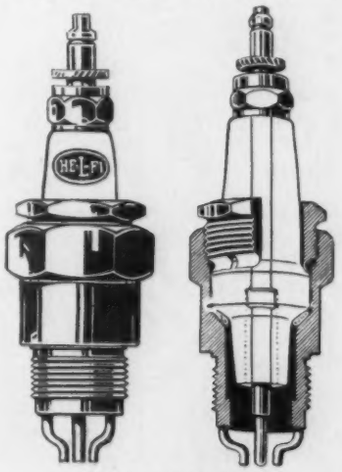
The price of this device is $9; west of the Rockies, $10.

The Hel-fi Spark Plug

The features of the Hel-Fi spark plug, manufactured by the Hel-Fi Company, 424 Meridian St., Indianapolis, Ind., are the parallel electrodes and the spring gland construction.

The electrodes extend into the combustion chamber. This construction the maker states, produces more perfect and instantaneous combustion, as well as easy starting.

The spring gland feature is shown in the cut-a-way view, which is designed to prevent breaking of the porcelain and at the same time stop the compression leakage. Spring Verona washers and copper asbestos gaskets are used to insure constant alignment and compact-



The Hel-fi Plug
This spark plug is shown herewith in the external view and also with a section cut away, disclosing the internal spring gland.

ness without rigidity, also to take care of the contraction and expansion of the parts. Prices are $1.25 for the Duplex plug and $1 for the Standard.

The New Cantello Carburetor

The Automotive Supply Corporation, 1776 Broadway, New York City, is marketing the Cantello carburetor, a new instrument especially designed to handle the variety of low grade fuels now on the market, and to meet variations in temperature and altitude conditions. The floating valve, in this carburetor, instead of being of a predetermined weight and being lifted by the suction of the engine, is extremely light in weight and is drawn downward by the vacuum operating on the under side of the valve through the venturi section. The acceleration and flexibility of this instrument are due to the construction of the dashpot and to the design of the metering pin in relation to the cone-shaped air valve.

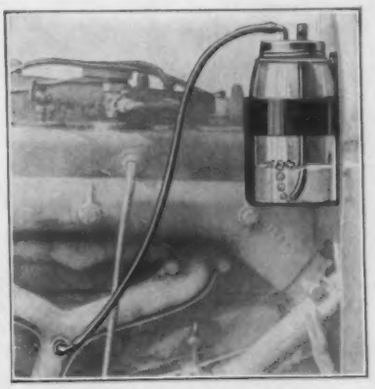
When idling, the primary air travels through the same ports used for gasoline when the throttle is in any running position, but in the reverse direction, the gasoline being supplied through the main jet. It has two adjustments, one for idl-

The New Cantello Carburetor

ing and the other for speed. The carburetor sells for from $20 to $40, made in 1-in. to 2-in. sizes.

The Workrite Carbon Remover and Gasoline Saver

This device is designed to mix a small amount of water vapor with the gas vapor in the intake manifold, to improve combustion and remove carbon. It consists of a metal frame for holding a glass jar, in the cap of which there is an adjustable inlet valve to regulate the amount of air passing down through the tube. From the end of this tube the air bubbles up through the water and is drawn out the pipe from the top of the jar. The connection from the elbow, in the top of the jar, is by a rubber tube,



Workrite Carbon Remover
This is a humidifier and the maker claims it will remove carbon and save fuel

which extends to the ⅛-in. pipe thread connection which is screwed into the intake manifold. This device sells for $1.75, and is made by The Workrite Manufacturing Co., 5606 Euclid Ave., Cleveland, Ohio.

The Albany High-Speed Tool Room Drill

The Albany Hardware Specialty Mfg. Co., of Albany, Wis., is making the drill illustrated herewith. It is a very convenient and rapidly-handled all-around drill press and can be quickly stopped and started, and the drills can be readily changed.

Albany High-Speed Tool Room Drill

The drill overall is 72 in. in height and has a capacity ranging from ½-inch holes to the centre of a 12-in. circle. The spindle is ⅞-in. and regularly furnished with a No. 1 Morse taper socket, although a No. 2 can be furnished at an extra charge.

The vertical travel of the spindle is 4½ in., the table 9½ x 11½ in. The belt pulley is 5½ x 2⅛ in. The speed is from 268 to 2140 r. p. m., with 10 changes. Weight 315 lb.

An index at top of the drill press tells at what speed the drill is running and at what speed it should run in various metals when using carbon drills. The speed is doubled for high-speed drills. The upper drive shaft is mounted on silent type radial ball bearings, as is also the friction wheel which drives the spindles.

The hemisphere is made of cast iron and the surface is ground. Its bearings consist of a radial and a radio-thrust ball bearing to reduce the friction as far as possible. The hemisphere spindle is pivoted so that the relative axis to the two friction wheels can be changed instantly. The hemisphere is brought into contact or disengaged from the friction wheels by means of a nut on the hemisphere spindle carrier. As the hemisphere is forced into contact with the upper friction wheel it is set in motion and this motion is imparted to the friction wheel on the spindle. So by varying axis of hemisphere the friction wheels come into contact with various diameters, and various speeds result.

The drill spindle is made of tool steel, ground to exact dimensions, with a smooth finish. The positive depth stop is used for duplicate depth drilling and can be set in position with one hand while the drill is in motion.

The micrometer depth gauge is English measure on one side and metric measure on the other, and is easily changed about. It is set at zero when the drill enters the work and the exact depth of the cut is shown on the index at all times.

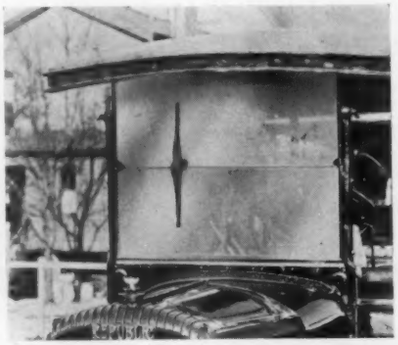
The drill table has an oil channel which may be swung around the column out of the way or returned to center position accurately. This drill can be furnished equipped with a ½ hp. electric motor with attachments complete.

Tri-Co Rain Rubber

Tri-Co Rain Rubber is a device for cleaning the windshield, which makes use of the slot between the upper and lower glasses, sliding clear across the windshield and cleaning both the upper and lower glasses. It is attached by opening the windshield and slipping on the upper glass. As it touches nothing but the glass, it will not wear a hole in the top or scratch the finish off the windshield frame.

It is flexible, being made of multiple gum rubber, and has two cleaning surfaces on either arm, to remove rain or snow and wipe dry. All rivet heads are topped with celluloid. It can be operated by driver or passenger.

The Rain Rubber is adjustable to various widths of glass, and is made in four different models for every type of two-piece windshield. The price of this device is $1.50. It is made by the Tri-Continental Corp., Sidway Bldg., Buffalo, N. Y.

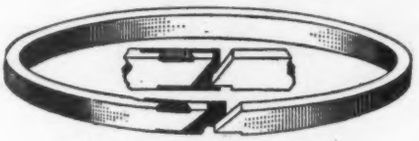


Tri-Co Rain Rubber Attached to Windshield of a Republic Truck

This company is also marketing a celluloid weatherstrip, the Tri-Co Transparent Weatherstrip. It is easily attached and easy to keep clean. It is invisible when fastened to the glass.

The Permaseal Piston Ring

As will be noticed in the accompanying illustration the Permaseal piston ring, made by the Grundy Manufacturing Corp., 518-22 W. 57th St., New York City, packs 2 joints, both the seat and the piston groove on the wall of the cylinder, as it is compressed. This feature, the maker states, prevents leakage of oil into the combustion chamber, or waste of gas into the crankcase and bearings. These rings are of the one-piece type. The patent sealing joint insert is built on it and rigidly attached. It is held in place by a stud, formed from the ring itself during the milling-out process, and not by an inserted rivet or pin.



The Permaseal Ring and Joint

The top of the ring is mitre cut. This scientific milling out of the ring, together with the stud, makes it impossible for the insert or joint to slip or become loose in usage.

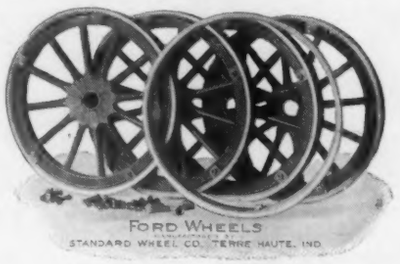
Apco Horn Button for Throttle Lever

The Apco Mfg. Co., Inc., of Providence, R. I., has added to its line of accessories the Apco horn button, which is attachable to the throttle lever under the steering wheel, where it can be reached easily and without moving the hand. This horn button should appeal to the Ford car owner in that there is no danger of an accident, and when shutting off the throttle for corners and cross roads the horn can be sounded with the same movement. The retail price of this horn button is $.75 and it comes complete with wire, tape, etc.

Apco Horn Button Attached to Steering Wheel of Ford

Wheel Sets for Ford Cars

The Standard Wheel Company, of Terre Haute, Ind., is manufacturing sets of wheels for the Ford car, with or without demountable rims. These wheels are equipped with 30 x 3½-in. rims and in the case of the demountable outfit the set includes an extra rim and a wrench. These wheels are black or natural finish, and have the hub bolts ready to attach to the Ford hub, as shown in the illustration. The artillery type Ford wheel sells for $14.75 net per set, f.o.b.



The "Standard" Wheel Set

Vetex Brake Shoes Made From Wrought Iron Channel

The Vetex wrought iron channel brake shoes are made by Victor Steel Stamping Co., of 1528 Blake St., Denver, Col., and are sold lined or unlined.

Vetex Shoes for Fords

The Vetex wrought iron channel shoes are sold for $3.50 per pair, lined; and $1.50 a pair unlined

The maker claims that these shoes are exceptionally strong and can not be cracked or broken, even when worn down very thin, and also that they will not bend. No fine grit is given off as the brake shoes wear down. The lining is of a brand of extra heavy asbestos.

Hinkley Engine Models HA and HAA

In accordance with its announced policy of producing a complete line of engines, adaptable to all standard sizes of trucks and tractors, the Hinkley Motors Corp., of Detroit, has supplemented its Class B military engine, with Hinkley Models HA and HAA.

This company was organized a few weeks before the United States declared war. Its services were immediately placed at the Government's disposal, and were throughout hostilities, centered on the production of Class B truck engines. Facilities were developed which made the company one of the two largest producers of this engine.

The Hinkley Motors Corp. will continue to build the Class B engine, supplementing it, however, with the two less massive models now announced.

Both the new Hinkley models show plainly in design and workmanship the influence of the Class B engine on the Hinkley organization. Both resemble the B to such an extent that they seem almost its replicas in slightly smaller form. In many essentials they are duplicates, for all three have the detachable L-heads, three-point suspension, and hot-spot manifold of the ram's-horn type.

New Models Follow Class B Design

Both new models follow the B closely in such details as the large diameters of crankshaft and camshaft; unusually large bearing surfaces; roller-type valve-lifters; double connections for the water outlet header; unusually ample provision for bolting down the cylinder heads; large valve stems; rugged governor construction; extra heavy pistons, in sections to insure cool piston heads under maximum service; unusually large water jacketing, with special provision for cooling; provision against oil leakage at all possible points; extra large anchorage plate for the fan installation, bolted to the cylinder block on a square pad; complete metallic oiling system of copper tubing, clipped to the inside of the crankcase; automatic pressure regulating relief valve.

Cylinders of both the new models are cast en bloc with two heads, and mounted on a cast-iron case.

Both are equipped with a five-gear train in front, camshaft bolted to flange, with four alloy steel bolts. Idler gear runs in double, large-size, babbitt-lined, bronze-shell bearings. Full provision is made for installation of starting and lighting systems, when desired. Cooling is by centrifugal water pump, with one connection to each cylinder.

In each model the force-feed oil pump is submerged in the oil pan, and is integral with the crankcase, which can be dropped without disturbing the pump—a feature of unusual convenience.

The Hinkley Model HAA is designed to cover the field of 1- to 1½-ton trucks, or two-plow tractors. It has a cylinder bore of 3¾ in., a stroke of 5¼ in., and a displacement of 232 cu. in. This engine is also adaptable to a 4-in. bore, qualifying it for duty in trucks up to 2½ tons, and in three-plow tractors.

The Hinkley Model HA is 4½ in. in bore by 5½-in. stroke, and displaces 350 cu. in. It bridges the gap between the HAA and the massive Military Class B, in both the truck and tractor fields.

In the new models a successful maintenance of the government standards of workmanship have been adhered to, which is attested by the fact that both the HA and HAA show economy marks of better than six-tenth pounds of fuel per horsepower hour under maximum load conditions.

Brief specifications of the HAA are as follows:

Maximum hp.—35 at 2000 r.p.m.
Weight—Approximately 600 lb.
Oil Capacity—Approximately 8 qts.
Fuel Consumption—Approximately 3 gal. per hour, maximum load.
Crankcase—Semi-steel.
Method of Support—Three-point suspension; trunnion on gear case cover.
Carburetion—Equipped for any standard make of carburetor, in conjunction with hot spot manifold; size 1 in. S. A. E. Standard.
Governor—Integral with engine; all connections enclosed.
Diameter of Valves—1¾ in. throat.
Pistons—3 rings; cast iron.
Connecting Rod Bearings—Large end, 2⅛ in. 2¼ in. long; small end, 1⅛ in. x 1¾ in.
Main Bearings—Front, 2⅛ in. x 2¼ in.; center, 2¼ in. x 3 in.; rear, 2¼ in. x 3 in.

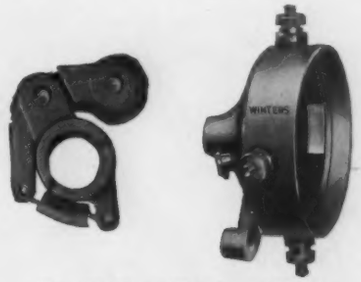
Specifications of the HA engine:

Maximum hp.—45 at 1500 r.p.m.
Weight—Approximately 800 lb.
Oil Capacity—8 quarts.
Fuel Consumption—Approximately 3½ gal. per hour, maximum load.
Crankcase—Semi-steel.
Method of Support—Three-point suspension; trunnion on gear case cover.
Lubrication—Force feed, gear pump in oil pan and under oil level.
Carburetion—Equipped for any standard make of carburetor, in conjunction with hot spot manifold; size 1¼ in.
Governor—Integral with motor; all connections enclosed.
Diameter of Valves—2 in. in throat.
Pistons—3 rings; cast iron.
Connecting Rod Bearings—Large end, 2¼ in. x 2½ in. long; small end, 1¼ in. x 1⅞ in. long.
Main Bearings—Front, 2¼ in. x 2½ in. long; center, 2⅝ in. x 3½ in.; rear, 2⅜ in. x 3½ in.

The Winters' Timer

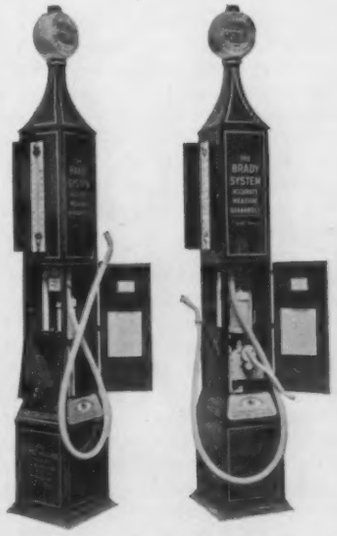
A simply constructed and accurately-made timer for Ford cars is being manufactured by the Leonard R. Winters Co., 5315 N. 2nd St., Philadelphia. The timer is constructed of good material, and the finish is excellent.

The commutator case is made from a single piece of specially prepared metal.



The Winters' Timer and Rotor

The contact points in it and the roller of the brush are of specially prepared steel. The contact points are permanently fastened so that they will not become loose or disconnected. The timer passes a rigid inspection, before being marketed, and is attached to a Ford engine casting and tested before leaving the factory.

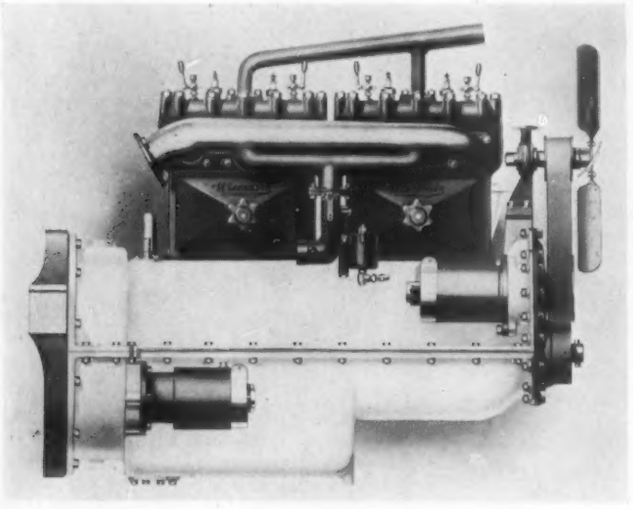


The Latest Type Visible Measure Gasoline Dispenser

This illustration shows the type A, electrically-driven, and Type B, hand-driven, gasoline dispensers manufactured by the Visible Measure Gasoline Dispenser Company of America, Inc., of Louisville, Ky. The old style was inadvertantly shown in our January issue, page 56.

Wisconsin Producing Liberty Model Engines

The Wisconsin Motor Mfg. Co., Milwaukee, Wis., is producing a new line of four-cylinder engines, known as the Liberty models, which were designed and developed in harmony with the most modern tendencies for truck and tractor service. The larger models, types "RAU" and "RBU," have a bore and stroke of 4¾ x 6- and 5 x 6 in. respectively. They are of the L-head type, twin-cylinder, with detachable heads, and are designed to handle the lower grades of fuel now on the market.



Wisconsin Liberty Model, Types RAU and RBU.

The three-point all-steel suspension is one of the important features of these engines. A cast steel or malleable supporting arm is bolted to the bell housing, while a large diameter trunnion bearing, on the iron front cover, forms the forward support.

The camshafts have large diameter bearings so that the cams will pass through, and a flange is forged integral for the mounting of the camshaft gear. These shafts are held in position by spring plungers at the forward end.

The valve tappets are of the roller type, of extra large diameter. The guides are of cast iron, held in position by crabs and studs. This entire mechanism is enclosed by oil-tight cover plates. The timing gears are of wide face, helically cut, the smaller gears being drop forgings, heat treated, while the camshaft gear is cast iron.

All main and connecting rod bearings, as well as camshaft, pump drive shaft, and idler gear bearings, are of babbitt lined bronze. Main and rod bearings are fitted with one piece laminated shims.

The oiling system is of the pressure type, an oil header being cast into the crankcase, with leads to the main bearings. The crankshafts are drilled so that the oil is also forced to the connecting rod bearings and through tubes on the rods to the wrist pins. The oil pump is bolted to the upper crankcase, and extends down into the oil reservoir. A large screen surrounds the oil pump, and this screen can be removed for cleaning without disturbing the oil pump or the oil pan. A relief valve is provided on the pump so that a constant pressure is maintained.

The inlet and exhaust manifolds are cast of iron in one piece, and so designed that the heat of the exhaust will vaporize the low grade of fuel now in use.

A substantial fan drive is provided with a 2-in. belt to drive the larger fans necessary for truck or tractor service. Provision is made for mounting electric generators and starting motors, by the S. A. E. standard flanges.

The engine is suitable for either left or right-hand steering gear. A drive for the various commercial governors is also provided, and manifolds can be furnished to accommodate same.

Four x 6-in., 4¼ x 6-in., and 4½ x 6-in. engines are also being built, known as types "TAU," "UAU" and "VAU" respectively. These engines follow the above specifications throughout, with the exception of the cylinders being four en bloc, instead of twin castings, and the tappers being of the mushroom type instead of the roller type. The various dimensions are, of course, reduced proportionately, the crankshaft being 2 in. in diameter throughout, of a special chrome nickel steel.

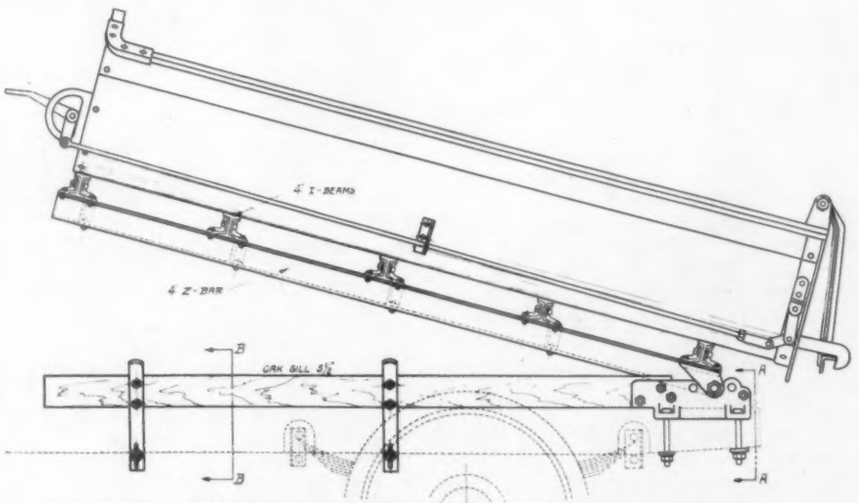
For smaller trucks this company offers its "CAU" 3¾ x 5-in., and "EAU," 4 x 5-in. In a general way, these engines also follow the above specifications. The principal exceptions are cylinders cast en bloc, with solid head instead of detachable, and mushroom-type of tappers as on the "TAU" and "UAU." No relief valve is fitted to the oil pump on the "CAU" and "EAU" engines, as the pump is smaller and does not require a pressure relief.

The K. & J. Adjustable Underframe Permits Use of Various Bodies

The Kilbourne & Jacobs Mfg. Co., of Columbus, Ohio, calls attention to its K. & J. adjustable underframe, by the use of which any K. & J. body may be mounted on practically any chassis frame without special shop process. Hoist mounting and the cutting off of a chassis frame is considered a shop process.

By referring to the cross-section "BB" it will be noted that the trans-member (a 4-in. I-beam) is riveted securely to the body plate. Slot openings are provided in the trans-member to permit of lateral adjustability. The malleable casting "brackets" are riveted securely to the "Z" bar super-sill, giving additional strength to this member. In this manner the super-sill may be adjusted laterally by merely loosening bolts through brackets and slot. (Lock washers are used on these bolts.)

The makers furnish an adjustable seasoned oak "cushion-sill," which is riveted to an adjustable "lug" hinge casting. (See side view.) This completed "cush-

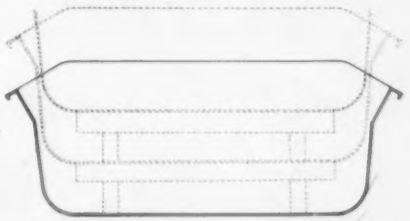


Side View of the K. & J. Standard Steel End Dumping Body
This illustrates the "partial dumping" tailgate control, giving 2½" and 5" and total release. Also the adjustable underframe design D

ion-sill" is attached to chassis frame by "vice grip," clamps and bolts. A wooden block is fitted within the chassis frame channel where clamp bolts extend around this member to allow tightening of bolts without bending inward the flange of the frame members. This method eliminates the drilling of holes in the frame.

The "hinge rod" is also adjustable by means of a "turn-nut," and castellated nuts on each end. The socket hinge castings are securely riveted and bolted to the trans-member by means of specially strong brackets, in consequence, the pivot movement reacts from end to end of trans-member, in place of from sill to sill, giving great rigidity to the rear end of body when elevated for dumping.

The entire design affords a maximum of "cushion" sill, and a minimum of height between chassis frame and body plate consistent with wheel clearance.



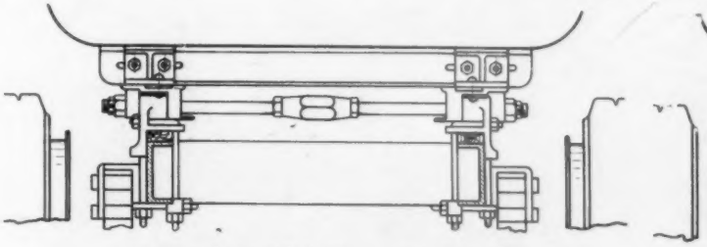
Illustrating Cross Section of K. & J. Bodies and the Nesting Feature

A ¼-in. steel wearing plate is riveted on inside of "cushion-sill" at proper intervals, to eliminate shaving of oak sill by "Z" super sill.

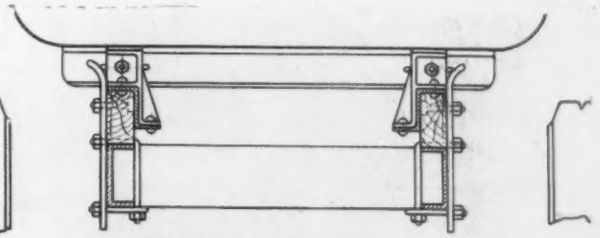
The adjustability of "lug" hinge casting (3 holes) is provided to avoid confliction of clamp bolts and rear shackle bolt casting, while placing body in proper position, longitudinally, with respect to hoist.

The "K. & J." bodies are shipped complete and "nested" tailgate knock-down, and the cross-sectional contour is correct to give the "balance to the load with the least amount of lateral rocking," thus reducing to a minimum frame and spring troubles which are often caused by extreme width or unusually high center of load.

The tailgate operation is positive in action, but has a ratchet control, which allows operator to "spread" materials when truck is in motion, if required.



Section A-A of Side View. See Page 50. Underframe Design D, Bolted Method



Section B-B of Side View. See Page 50. Illustrating the Adjustable Underframe

Automobile Accessories Branch of the National Hardware Association to Hold Annual Meeting

The Automobile Accessories Branch of National Hardware Association of the United States announces its annual meeting to be held in the Hotel Statler, Detroit, Mich., March 20-21, 1919. An advance notice of this meeting is being sent to all associate members. In connection with the annual meeting there is to be held an exhibition of products manufactured by associate members. This exhibition does not require costly displays and all expenses are to be borne by the Association. Each exhibitor may have 24 sq. ft. of table space. All those who intend to exhibit their products are asked to notify the chairman, A. H. Nichols, Buhl Sons Co., P. O. Box 1596, Detroit, Mich. Likewise, if you do not intend to exhibit, it would be appreciated if the committee were informed of it.

Bills Introduced in Ohio State Legislature

House Bill No. 118, introduced at the present session of the Ohio State Legislature provides that it shall be unlawful for any person, firm or corporation to locate, build, construct, maintain or operate a public garage or oil filling station on the same square upon which is located any church, hospital or public or parochial school, or within 200 ft. thereof. Whoever violates any provision of this section shall be fined not less than $25, nor more than $100, and each day's continuance of such maintenance or operation shall be deemed a separate offense.

House Bill No. 160 provides that motor vehicles shall display either a red light or a green light while said motor vehicle is in motion, and a red light while the same is not in motion. This would confuse drivers, as it makes two different signals permissible for the same thing.

House Bill No. 57 provides that it shall be unlawful for the owner of any automobile, motorcycle or other motor vehicle to transfer the ownership and possession of said vehicle, whether by sale or otherwise, to a person, firm or corporation, unless he gives to the purchaser a certificate of ownership, which shall set out the name of the person, firm or corporation from which said vehicle is acquired, and the name and the address of the person, firm or corporation to whom the ownership and possession is transferred. This certificate of ownership must be signed under oath before a notary public.

Canada Leads in Purchase of American Trucks

U. S. Customs report shows that 1596 commercial cars valued at $2,035,464 were exported to Canada in 1918.

Canada leads also in the purchase of parts of motor cars, not including tires and engines, with $11,617,494 worth of material; England second with $6,951,699, and France third, with $5,069,426.

Hog Hauling Profitable With Motor Trucks

Samuel Deal, a well known farmer residing four and three-quarter miles north of Stanford, Ill., purchased a 1½-ton Republic truck and kept a record of his experiences in handling live stock to market. He transported fifty head of hogs to the railroad station, handling ten head at each trip. He loaded one consignment at 7.30, made the run of four and three-quarter miles, unloaded them at the stock yards and was back on the farm and ready to start with the second load at 8.25 A. M., consuming but forty-five minutes for the round trip. A neighbor who used six teams to haul a similar consignment did not record such a rapid movement.

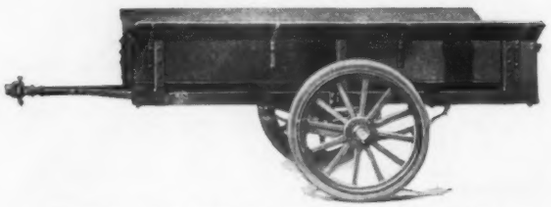
Mr. Deal started to haul at the same time as his neighbor. On Mr. Deal's second trip he passed the last two teams of his neighbor, having passed the other six during the first trip. Each wagon of the neighbor carried six hogs, while Mr. Deal, with his truck, never took less than ten, and occasionally handled eleven. The truck, therefore carried two-thirds greater tonnage and did in forty-five minutes what a team required two and a half to three hours to perform. Mr. Deal has become convinced that a truck is just what he needs for hauling his stock, grain and other farm products, effecting a remarkable saving in expense, and also in time. He believes that the truck has solved the farmers' transportation problem.

What There is on the Market in Trailers

We have attempted in this review to illustrate and give specifications of only the models catalogued by the makers as standard. Not all specifications given are accompanied by illustrations. A list of the makers represented in this review is given on page 62.

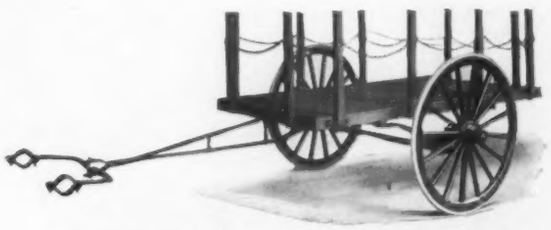
Two-Wheeled and Semi-Trailers

Columbian Model 100-G, 1000 lb., Two-Wheel.
Columbia Wagon Co., Columbia, Pa.

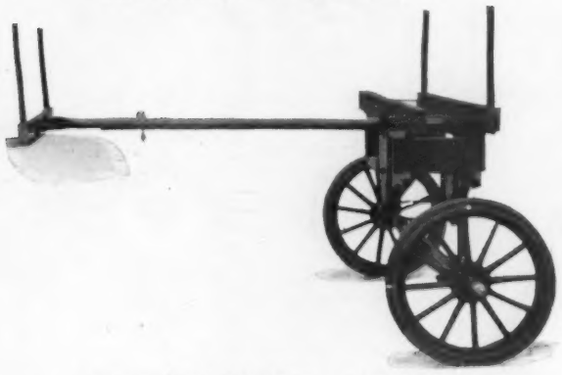


Standard A-6, 1000 lb. Two-Wheel Type, $110.
Standard Trailer Co., Cambridge Springs, Pa.

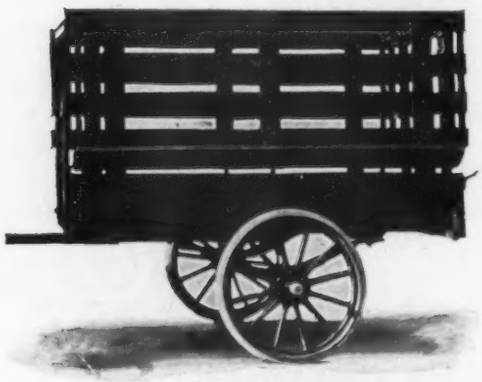
Hopp Two-Wheel Trailer.
Hopp Carriage Co., Mifflinburg, Pa.



Defiance Model 5, 1000 lb., Two-Wheel Trailer, $41.50.
Defiance Carriage Co., Defiance, O.



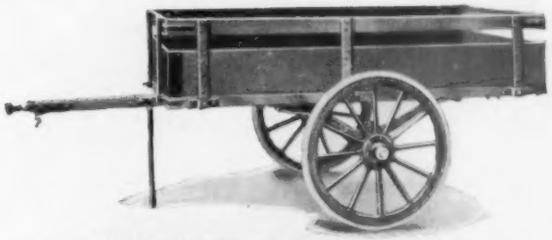
Hesse Model 100, 800 lb., Semi-Trailer.
Can be used with or without bodies. Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.



Minute Truck, Model 21, 1000 lb., $100.
J. H. Whetstone & Co., Lapeer, Mich.

2-W

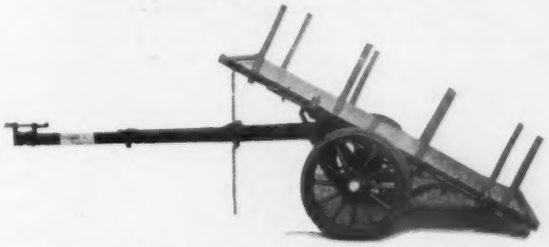
Trade Name and Model	Capacity	Length of Platform	Width of Platform	Frame	Height of Platform From Ground	Width of Tread	Tires	Wheel Bearings	Is Body Furnished Standard?	Is Trailer Reversible?	Price
600, 700 and 750 Pound											
Columbian 100 E	600	72	42	Wood	..	..	30x2	Ball	Yes	No	....
Columbian 100 F	700	84	46½	Wood	..	..	36x2	Ball	Yes	No	....
Columbian 100 C	750	84	40	Wood	..	..	30x2	Ball	Yes	No	....
Columbian 100 D	750	84	40	Wood	..	..	30x3*	Ball	Yes	No	....
800 Pound											
Hesse Semi 100	800	..	..	....	42	56	28x2	Ball	....	No	....
Hesse 15 C	800	72	40	....	..	..	27x2	Ball	....	No	....
Hopp	800	60	40	Channel	24	56	.....	Timken	Yes	No	....
Standard C	800	60	42	Wood	25½	56	.....	....	Yes	No	65
1000 Pound											
Auto Kamp B	1000	72	44	Wood	25	56	32x1½	Roller	Yes	No	105
Columbian 100 A	1000	96	46½	Wood	..	..	36x2	Ball	Yes	No	....
Columbian 100 B	1000	83	40	Wood	..	..	36x2	Ball	Yes	No	....
Columbian 100 G	1000	96	46½	Wood	..	..	36x2½	Ball	Yes	No	....
Defiance No. 5	1000	72	42	Wood	24	56	34x1¼	Ball	Yes	No	41.50
Delker No. 5	1000	72	44	Wood	27	56	.....	Timken	No	No	60
Standard A6	1000	96	46	Wood	24	56	28x2	....	Yes	No	110
Whetstone-Minute	1000	72	42	....	..	56	30x2	Ball	Yes	No	100



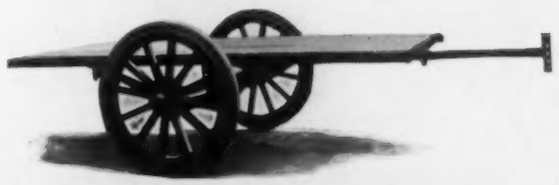
Hoof Model H3, 2000 lb., Two-Wheel Trailer, $72.
Hoof Bros. Mfg. Co., Plato, Minn.

Standard B-8, 2000 lb. Two-Wheel Type, $130.
Standard Trailer Co., Cambridge Springs, Pa.

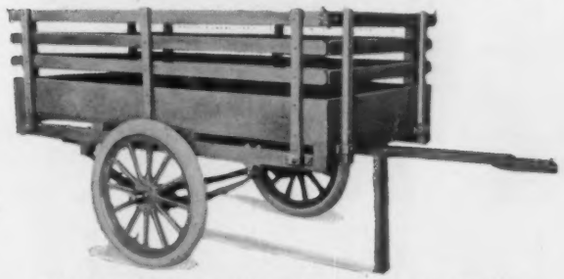
Harper 1500 lb. Two-Wheel Type, $68.
Harper Buggy Co., Columbia City, Ind.



Los Angeles Model B Special, 2000 lb. Dumping Trailer, $290.
Los Angeles Trailer Co., 1328 Palmetto St., Los Angeles, Cal.



Hesse Model 19, 1200 lb., Two-Wheel Trailer.
Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.



Highway Model A, 1500 lb., Two-Wheel Trailer, $98.
Also made in 2000 lb. capacity, $125; 3500 lb. capacity, $250.
Highway Trailer Co., Edgerton, Wis.

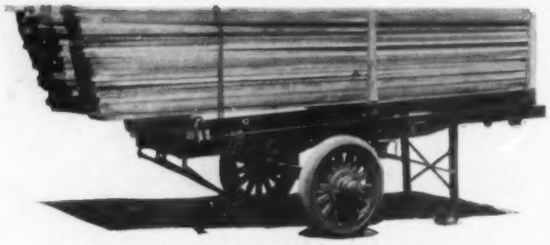
Hummer Suburban Trailer, $76.80.
Hummer Vehicle Works, Chicago Heights, Ill.

Miles Model 41, 2000 lb., $150.
Miles Mfg. Co., 351 S. Park Ave., Jackson, Mich.

2-W

Trade Name and Model	Capacity	Length of Platform	Width of Platform	Frame	Height of Platform From Ground	Width of Tread	Tires	Wheel Bearings	Is Body Furnished Standard?	Is Trailer Reversible?	Price
1200 and 1500 Pound											
Fowler	1500	71¾	42½	Wood	..	..	30x3*	Ball	No	No	125
Harper No. 10	1500	72	40	Wood	26	56	.....	Timken	Yes	No	68
Hesse 19	1200	96	48	Angle	27	..	32x3	Bower	Yes	No	....
Hesse Semi 90	1500	..	..	....	42	56	30x2½	Bower	....	No	....
Highway A (Ford)	1500	..	..	Wood	..	..	32x2	Roller	Yes	No	98
Hummer Suburban	1200	74	44½	Wood	22½	..	34x1⅛	....	Yes	No	76.80
2000 Pound											
Detroit Pole	2000	..	..	Channel	..	56	36x3	Roller	....	....	350
Highway B (Ford)	2000	..	..	Wood	..	..	32x2	Roller	Yes	No	125
Highway E5	2000	..	..	Channel	17¼	56	36x3	Roller	No	No	365
Hoof P1	2000	72	45	Wood	..	62	30x3*	Ball	Yes	No	80
Hoof H2	2000	72	45	Wood	..	62	34x1¼	Ball	Yes	No	70
Hoof H3	2000	72	45	Wood	..	62	30x1¾	Ball	Yes	No	72
Hoof H4	2000	72	45	Wood	..	62	34x1¼	Ball	Yes	No	87
Los Angeles B Sp. Dump.	2000	96	47½	Angle	31	..	34x3	Bower	Yes	No	290
Martin Semi 1	2000	108	42	Wood	43	56	.....	Roller	Yes	No	250
Martin Draw Type	2000	108	42	Wood	40	56	36x2½	Martin	Yes	No	215
Martin Ex 1	2000	204	42	Wood	..	56	.....	Roller	....	No	250
Miles 41	2000	86	42	Wood	30	56	.....	Ball	....	No	150
Standard B8	2000	96	46	Wood	25½	56	32x2	Bower	Yes	No	130

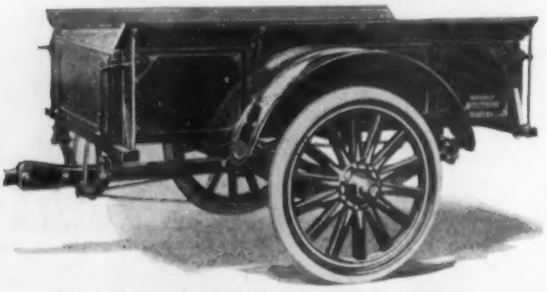
* Pneumatic.



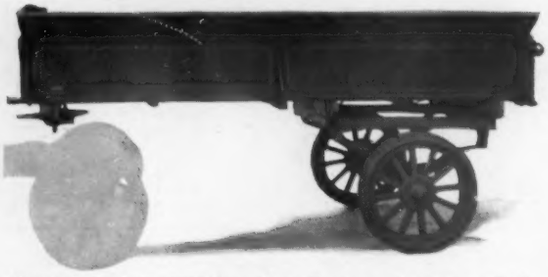
King S-2, 4000 lb., Semi-Trailer.
Specially fitted for hauling lumber. King Trailer Co., Ann Arbor, Mich.

King Pole Trailer.
Made in three sizes: P15, 3000 lb.; P25, 7000 lb.; P50, 10,000 lb. King Trailer Co., Ann Arbor, Mich.

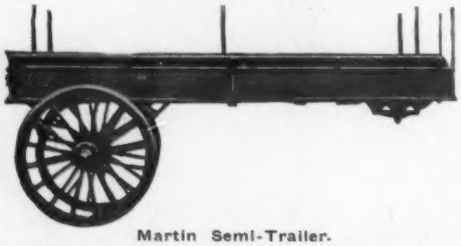
Hesse Model 80, 2500 lb., Semi-Trailer.
For carrying lumber or long material. Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.



Warner, Model G-31, 2500 lb. Two-Wheel Type.
Warner Mfg. Co., Beloit, Wis.

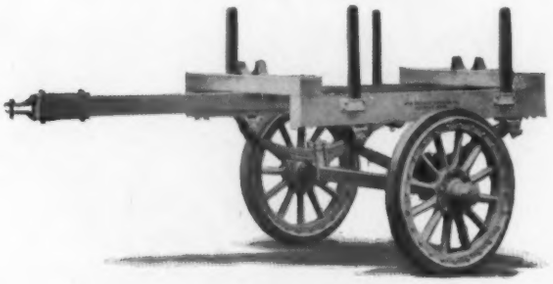


Hesse Model 80, 2500 lb., Semi-Trailer with Wing Body.
Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.



Martin Semi-Trailer.
Made in two sizes: 2000 lb., $250, and 3000 lb., $275. Martin Rocking Fifth Wheel Co., 23 Besse Pl., Springfield, Mass.

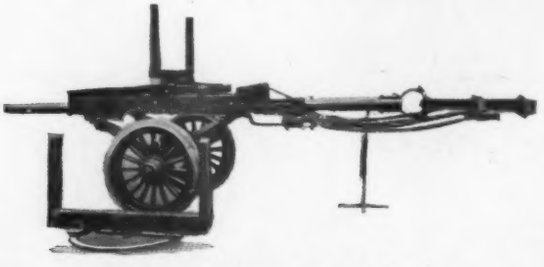
Martin 2000 lb. Draw Type Trailer, $215.
Martin Rocking Fifth Wheel Co., 23 Besse Pl., Springfield, Mass.



Detroit Pole Trailer.
Made in three models: 2000 lb., $350; 3000 lb., $425; 5000 lb., $550. Detroit Trailer Co., 465 Stanley Ave., Detroit, Mich.

Los Angeles Model BB, 3000 lb. Two-Wheel Type.
Los Angeles Trailer Co., 1328 Palmetto St., Los Angeles, Cal.

Highway Model S-2, 6000 lb., Pole Trailer, $495.
Also Model R-2, 4000 lb. capacity, $395. Highway Trailer Co., Edgerton, Wis.



Menning Sliding Pole Trailer.
Made in three sizes: 4000 lb. $555; 6000 lb., $627.50; 10,000 lb., $732. Texas Wagon Works, 101 Crawford St., Houston, Texas.

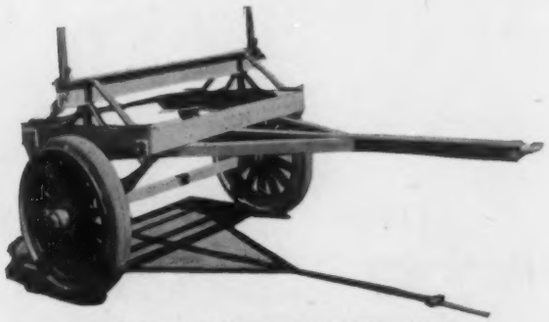
Hesse Model 60-P, 8000 lb., Pipe and Pole Trailer.
Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.

Los Angeles 6000 lb., Fifth-Wheel Type, $560.
Los Angeles Trailer Co., 1328 Palmetto St., Los Angeles, Cal.

Watson 100 cu. ft. Bottom Dump Semi-Trailer, $650.
Watson Wagon Co., Canastota, N. Y.

Lee, Model P-2, 4000 lb. Pole Trailer, $450.
Also made in three other capacities: P-4, 8000 lb., $600; P-6, 12,000 lb., $900; P-10, 20,000 lb., $1400. Lee Loader & Body Co., 2343 S. LaSalle St., Chicago, Ill.

Trailer Truck, Model C, 6000 lb.
With quick detachable fifth-wheel. Trailer Truck Co., Nashotah, Wis.

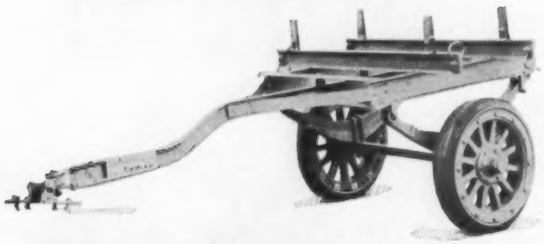


Reliance 7000 lb. Pole Trailer, $410.
Also make other sizes ranging from 800 lb. to 10,000 lb. capacity. Reliance Trailer & Truck Co., Inc., 30 Eighth St., San Francisco, Cal.

2-W

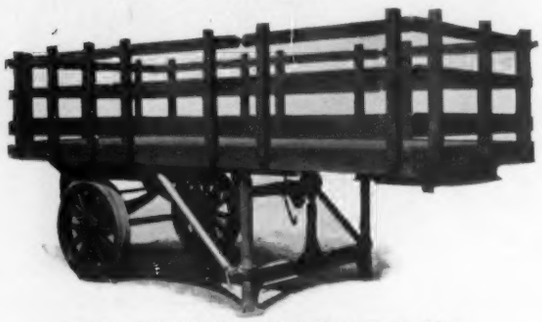
Trade Name and Model	Capacity	Length of Platform	Width of Platform	Frame	Height of Platform From Ground	Width of Tread	Tires	Wheel Bearings	Is Body Furnished Standard?	Is Trailer Reversible?	Price
2500 Pound											
Hesse Semi 80	2500	..	..	....	39	56	32x3	Bower	....	No	....
Warner G31	2500	82	45	....	..	..	36x3	Bock	Yes	No	....
Warner D5	2500	..	58	Channel	43⅞	56	36x3	Bower	....	No	....
3000 and 3500 Pound											
Detroit Pole	3000	..	..	Channel	..	56	36x4	Roller	....	....	425
Highway C (Ford)	3500	..	..	Channel	..	..	32x2	Roller	Yes	No	250
Hoof H5	3000	72	45	Wood	..	62	34x1¼	Ball	Yes	No	75
King S15	3000	144	60	Channel	46	56	34x3½	Roller	....	No	....
King P15	3000	..	..	Channel	47	56	36x4	Roller	....	No	....
Los Angeles BB	3000	94½	45½	Angle	33	..	36x3½	Bower	Yes	No	285
Martin Semi 1½	3000	144	42	Wood	43	58	.....	Martin	Yes	No	275
Martin Ex 1½	3000	204	42	Wood	..	58	.....	Martin	....	No	275
4000 and 5000 Pound											
Detroit Pole	5000	..	..	Channel	..	56	36x6	Roller	....	....	550
Hesse Pole 70P	4000	..	42	Channel	48	60	34x4	Bower	....	No	....
Hesse Semi 70S	4000	..	42	Channel	50	60	34x4	Bower	....	No	....
Highway F5	4000	..	..	Channel	14⅞	56	36x3	Roller	No	No	445
Highway R-2 (Pole)	4000	..	..	Channel	..	..	32x4	Roller	Yes	No	395
King S2	4000	144	60	Channel	47	56	36x4	Roller	....	No	....
Lapeer Semi	4000	168	..	I-Beam	..	..	34x4	Roller	No	No	675
Lee P2	4000	..	..	Channel	50	56	36x4	Timken	....	No	450
Rogers	4000	..	..	Channel	..	56	36x5	Roller	....	No	465
Texas-Menning	4000	Opt	60	Opt	49	56	34x4	Timken	....	No	555
6000 Pound											
Highway S-2 (Pole)	6000	..	..	Channel	..	..	32x5	Roller	Yes	No	495
Highway G5	6000	..	..	Channel	16¾	58	36x5	Roller	No	No	765
King S3	6000	174	60	Channel	47	56	36x5	Roller	....	No	....
Lapeer Semi	6000	168	..	I-Beam	..	..	34x5	Roller	No	No	825
Lee S3	6000	144	64	Channel	46	56	36x5	Timken	Yes	No	600
Los Angeles S-3	6000	180	..	I-Beam	43	..	36x5	Bower	....	No	560
Martin Ex 3	6000	204	60	Wood	..	56	.....	Martin	....	No	560
Rogers	6000	..	..	Channel	..	56	36x7	Roller	....	No	700
Texas-Menning	6000	Opt	60	Opt	49	60	36x5	Timken	....	No	627.50
Trailer Truck C	6000	..	..	Channel	..	56	36x3	Timken	No	No	....
Trailmobile Semi	6000	..	..	Channel	..	66½	36x6	Roller	No	No	....
Watson Semi-Dump	100 cu. ft.	95½	40½	....	..	60	5-in. Steel	Timken	Yes	No	650

King S-5, 10,000 lb., Semi-Trailer.
King Trailer Co., Ann Arbor, Mich.

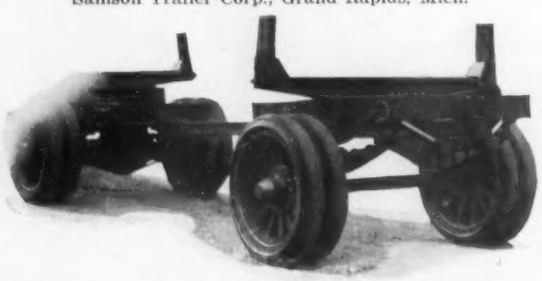


Los Angeles 10,000 lb. Pole Trailer, $520.
Los Angeles Trailer Co., 1328 Palmetto St., Los Angeles, Cal.

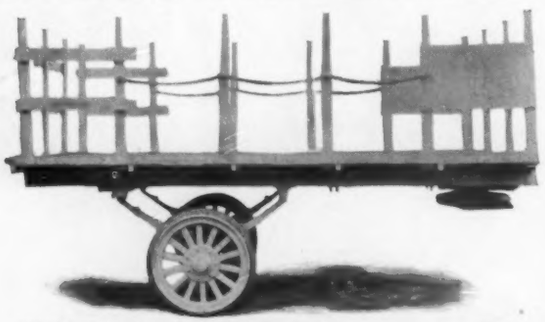
Studebaker Model 7976, 10,000 lb. Two-Wheel Trailer
Studebaker Corp., South Bend, Ind.



Samson 12,000 lb. Fifth-Wheel Type, $750.
Samson Trailer Corp., Grand Rapids, Mich.

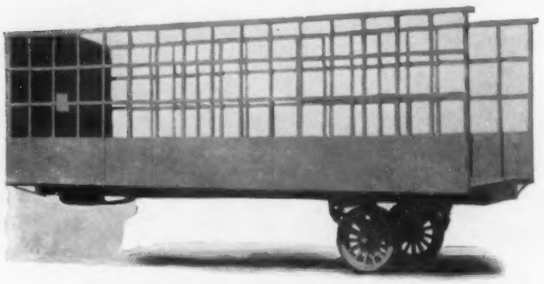


Lee, Model P-10, 20,000 lb. Logging Trailer, $1400.
Lee Loader & Body Co., 2343 S. LaSalle St., Chicago, Ill.

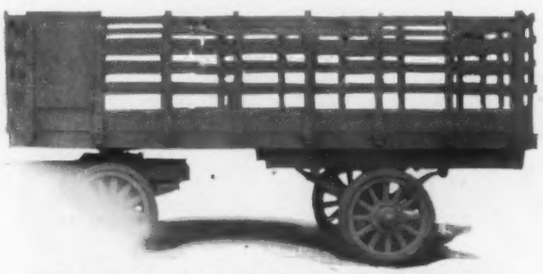


Highway Model G-5, 6000 lb., Fifth-Wheel Type, $765.
Also made in three other sizes: E-5, 2000 lb., $365; F-5, 4000 lb., $445; H-5, 14,000 lb., $965. Highway Trailer Co., Edgerton, Wis.

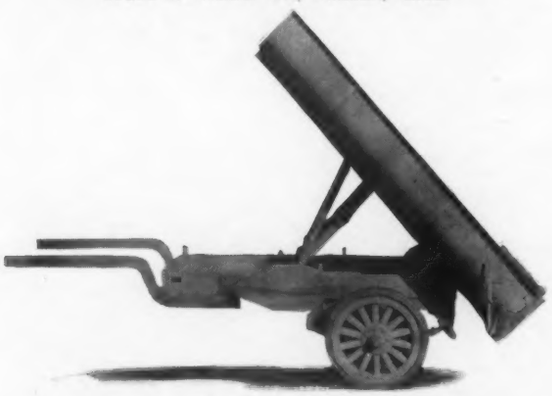
Samson 12,000 lb. Pole Trailer, $800.
Samson Trailer Corp., Grand Rapids, Mich.



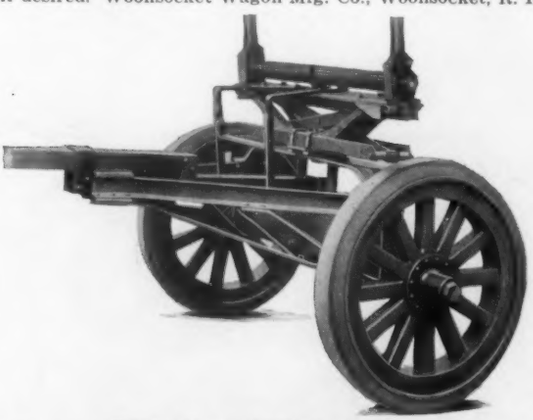
Lee Standard Semi-Trailer.
Made in three models: S-3, 6000 lb., $600; S-6, 12,000 lb., $800; S-10, 20,000 lb., $1250. Lee Loader & Body Co., 2343 S. LaSalle St., Chicago, Ill.



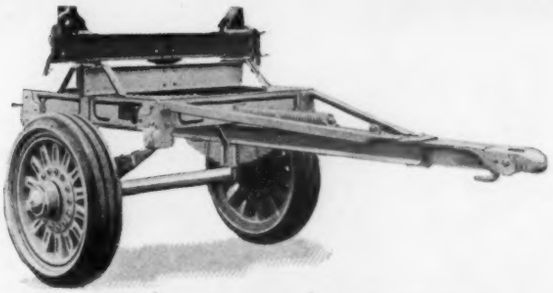
Columbia Model 6S, 12,000 lb., Semi-Trailer, $760.
For use with Columbia Tractor Truck. Columbia Motor Truck & Trailer Co., Pontiac, Mich.



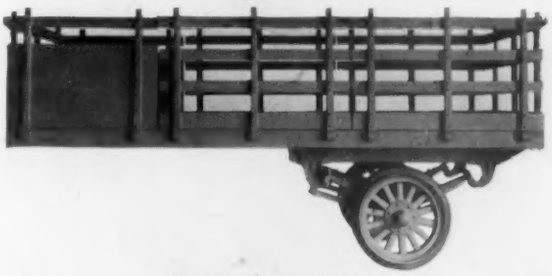
Woonsocket Two-Wheel Dump Trailer, $1100.
This model can be equipped with rear elevating feature if desired. Woonsocket Wagon Mfg. Co., Woonsocket, R. I.



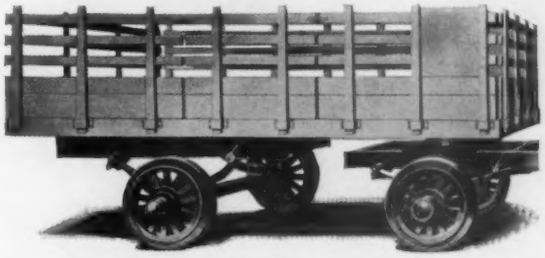
Trailer Truck, Model D, 10,000 lb.
With quick detachable fifth-wheel. Trailer Truck Co., Nashotah, Wis.



Warner Heavy-Duty Two-Wheel Trailer.
Made in four capacities: Model D-5, 2500 lb.; Model D-10, 3500 lb.; Model D-20, 5500 lb.; Model D-30, 11,000 lb. Warner Mfg. Co., Beloit, Wis.

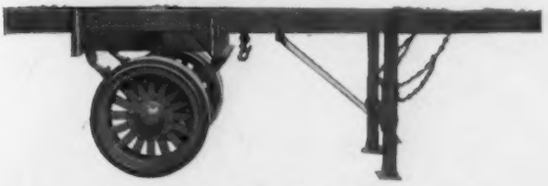


Fruehauf Semi-Trailer.
Made in three sizes: S240, 8000 lb., $715; S260, 12,000 lb., $815; S2100, 20,000 lb., $1525; 75 per cent. of load carried on trailer axle. Fruehauf Trailer Co., Detroit, Mich.

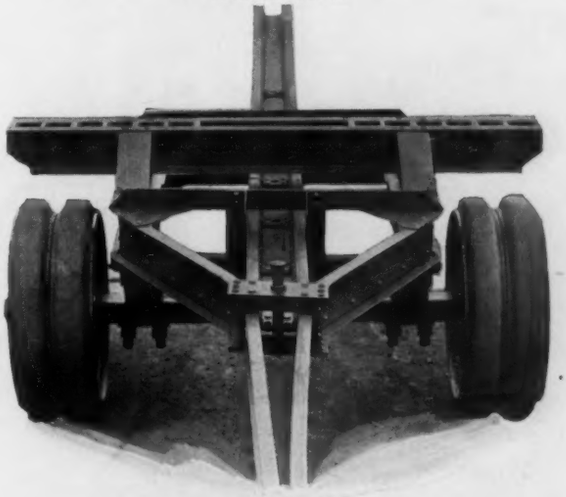


Victor, Model O, 12,000 lb., Semi-Trailer, $900.
Specially designed for use with Victor 2-ton, 114-in. wheelbase Tractor Truck. Victor Motor Truck & Trailer Co. 401 N. Hoyne Ave., Chicago, Ill.

Lapeer Fifth-Wheel Semi-Trailer.
Made in four sizes: 4000 lb., $675; 6000 lb., $825; 10,000 lb., $975; 15,000 lb., $1300. Lapeer Tractor-Truck Co., Lapeer, Mich.



Arcadia 10-ton Semi-Trailer.
Also made in 6-ton capacity. Arcadia Trailer Corp., Newark, N. Y.



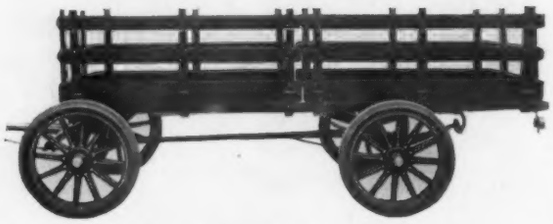
Rogers Logging Trailer.
Made in five capacities: 4000 lb., $465; 6000 lb., $700; 10,000 lb., $1075; 15,000 lb., $1385; 20,000 lb., $1760. Rogers Bros. Co., Albion, Pa.

2-W Trade Name and Model	Capacity	Length of Platform	Width of Platform	Frame	Height of Platform From Ground	Width of Tread	Tires	Wheel Bearings	Is Body Furnished Standard?	Is Trailer Reversible?	Price
7000 and 8000 Pound											
Fruehauf S240	8000	168	66	Channel	46	60	36x5	Timken	Yes	No	715
Hesse Pole 60P	8000	..	42	Channel	48	60	36x6	Bower	....	No	....
Hesse Semi Pole 60S	8000	..	42	Channel	51	60	36x6	Bower	....	No	....
King P25	7000	..	..	Channel	49	56	36x6	Roller	....	No	....
Lee P4	8000	..	..	Channel	50	60	36x6	Timken	....	No	600
Reliance	7000	96	48	Channel	36	58	36x6	Roller	....	....	410
Trailer Truck C2	8000	..	..	Channel	..	56	36x4	Timken	No	No	....
10,000 Pound											
King P50	10000	..	..	Channel	49	60	36x7	Roller	....	No	....
King S5	10000	174	72	Channel	50	60	36x7	Roller	....	No	....
Lapeer Semi	10000	192	..	I-Beam	..	..	34x6	Roller	No	No	975
Los Angeles Pole Dolly	10000	..	..	I-Beam	43	..	36x6	Bower	....	No	520
Rogers	10000	..	..	Channel	..	65	36x6D	Roller	....	No	1075
Studebaker 7976	10000	..	..	Wood	47	56	36x5	Plain	....	No	....
Texas-Menning	10000	Opt	72	Opt	49	72	36x7	Timken	....	No	732
Trailer Truck D	10000	..	..	Channel	..	56	36x5	Timken	No	No	....
Woonsocket Dump	10000	..	..	Channel	..	56	36x4	Roller	Yes	No	1100
11,000 and 12,000 Pound											
Columbia 6S	12000	192	72	Channel	..	..	36x6	Timken	Yes	No	760
Fruehauf S260	12000	192	72	Channel	49	66	36x7	Timken	Yes	No	815
Lee S6	12000	168	76	Channel	46	60	36x7	Timken	Yes	No	800
Lee P6	12000	..	..	Channel	50	64½	36x5D	Timken	....	No	900
Martin Ex 4	12000	204	60	Wood	..	58	36x5	Martin	....	No	710
Samson	12000	192	41	I-Beam	46	..	36x6	Timken	No	No	600
Victor O	12000	192	72	Channel	..	58½	36x7	Roller	Yes	No	900
Warner D30	11000	..	78¾	Channel	51⅛	62	36x8	Bower	....	No	....
14,000 and 15,000 Pound											
Highway H5	14000	..	..	Channel	16	60	36x5	Roller	No	No	965
Lapeer Semi	15000	192	..	I-Beam	..	..	36x5D	Roller	No	No	1300
Rogers	15000	..	..	Channel	..	72	36x7D	Roller	....	No	1385
20,000 Pound											
Arcadia Semi	20000	216	52	Channel	..	70	40x6D	Tap. Roll.	No	No	....
Fruehauf S2100	20000	216	84	Channel	51	72	40x6D	Timken	Yes	No	1525
Lee S10	20000	192	78	Channel	47	64½	40x6D	Timken	Yes	No	1250
Lee P10	20000	..	..	Channel	50	64½	40x7D	Timken	....	No	1400
Martin Ex 5	20000	204	60	Wood	..	60	36x6	Martin	....	No	865
Rogers	20000	..	..	Channel	..	72	36x8D	Roller	....	No	1760

D—Dual.

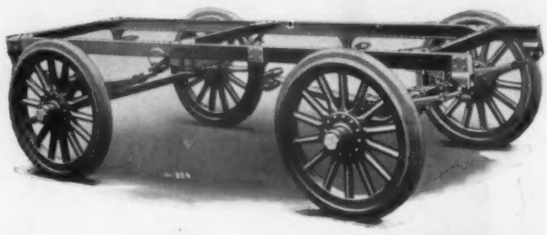
Four-Wheel Trailers

Miami Model 1, 1250 lb., $210.50.
Miami Trailer Co., Troy, Ohio.



Miami Model 12, 3000 lb., $341.50.
Miami Trailer Co., Troy, Ohio.

Miami Model 3, 1500 lb., $223.50.
Miami Trailer Co., Troy, Ohio.



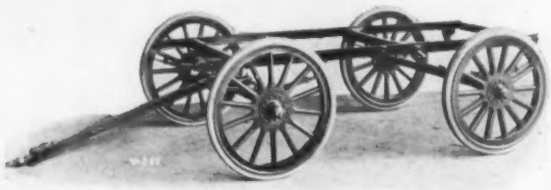
Trailmobile, Model D, 3000 lb.
Trailmobile Co., 538 E. Fifth St., Cincinnati, Ohio.

Hesse Model 8, 3500 lb., Four-Wheel Type.
Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.

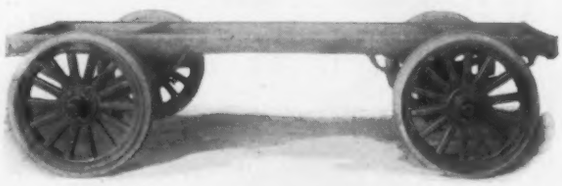
Hesse Model 10-B, 1200 lb., Short Turn Trailer.
Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.

Hi-Speed Trailercar, Model 14, 1400 lb., $240.
Northway Trailercar Co., East Rochester, N. Y.

Hi-Speed Trailercar, Model 20, 2000 lb., $290.
Northway Trailercar Co., East Rochester, N. Y.



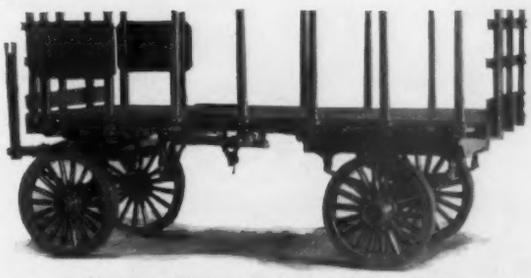
Trailmobile, Model C, 2000 lb.
Made also in 1250 lb. and 1500 lb. capacities. Trailmobile Co., 538 E. Fifth St., Cincinnati, Ohio.



Columbia Model 3T, 6000 lb., $850.
Columbia Motor Truck & Trailer Co., Pontiac, Mich.

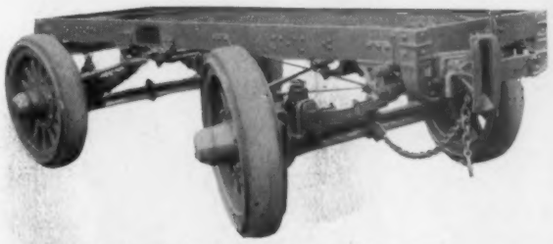
Detroit Four-Wheel Trailer.
Made in four models: 3000 lb., $800; 6000 lb., $1200; 10,000 lb., $1600; 14,000 lb., $1850. Detroit Trailer Co., 465 Stanley Ave., Detroit, Mich.

Arcadia Model 202, 4000 lb., $1080.
Brakes furnished when required; automatic draw-bar lock, operated outside of frame. Smith wheels extra. Arcadia Trailer Corp., Newark, N. Y.

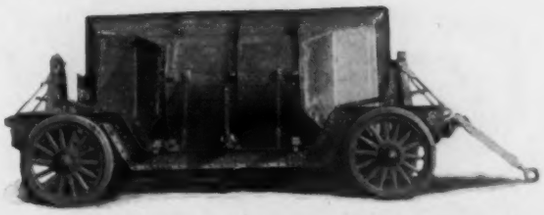


Watson 6000 lb. Platform Trailer, $725.
Watson Wagon Co., Canastota, N. Y.

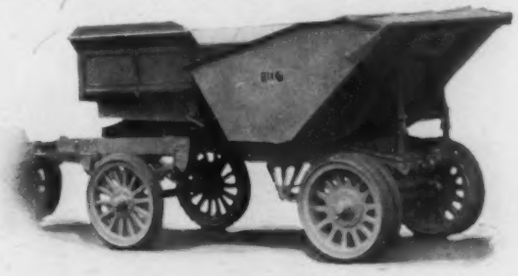
Ohio Four-Wheel Trailer.
Made in three sizes: 200D, 4000 lb., $890; 300F, 6000 lb., $1145; 500F, 10,000 lb., $1680. Ohio Trailer Co., Cleveland, Ohio.



Troy Model 212, 6000 lb. Trailer, $1175.
Made also in 4000 lb. capacity at $790. Troy Wagon Works Co., Troy, Ohio.



Lee, Model D-2, 5000 lb. Drop Frame Reversible Trailer, $1200.
Lee Loader & Body Co., 2343 S. LaSalle St., Chicago, Ill.



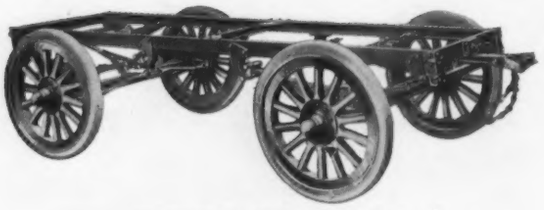
Lee End Dump Four-Wheel Trailer.
Can also be used as semi-trailer. This trailer is built in two sizes: C-3, 6000 lb., $1500, and C-6, 12,000 lb., $2000. These prices include body. Lee Loader & Body Co., 2343 S. LaSalle St., Chicago, Ill.

Highway Four-Wheel Trailer.
Made in five capacities: N-4, 6000 lb., $1185; P-4, 10,000 lb., $1585; K-4, 6000 lb., $1185; L-4, 10,000 lb., $1585; A-4, 4000 lb., $885. Highway Trailer Co., Edgerton, Wis.

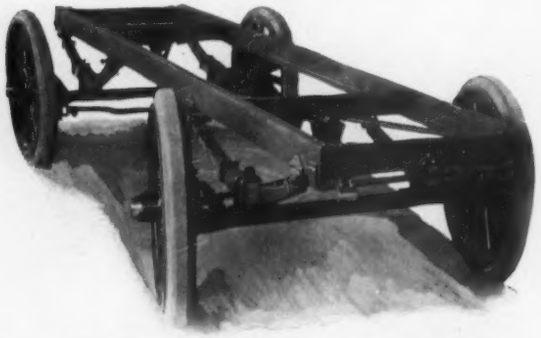
4-W

Trade Name and Model	Capacity	Length of Platform	Width of Platform	Frame	Height of Platform From Ground	Wheelbase	Width of Tread	Tires	Wheel Bearings	Is Body Furnished Standard?	Is Trailer Reversible?	Price
1200 to 1500 Pound												
Hesse 10B	1200	90	40	....	..	70	..	30x3*	Ball	Yes	Yes	....
Hesse 110F	1200	90	40	....	..	60	..	27x2	Ball	....	No	....
Hesse 12S	1300	90	40	Angle	27	..	..	28x2	Ball	....	Yes	....
Hi-Speed Trailercar 14	1400	108	37	Wood	21	72	56	30x3	Ball	Yes	No	240
Miami 1	1250	96	38	Wood	26	70	56	.....	Timken	....	No	210.50
Miami 3	1500	96	42	Wood	26	70	56	.....	Timken	....	No	223.50
Trailmobile A	1250	..	..	Angle	..	62	56	.....	Roller	No	No	....
Trailmobile B	1500	..	..	Angle	..	62	56	.....	Roller	No	No	....
2000, 2500, 3000 and 4000 Pound												
Arcadia 202	4000	144	72	Channel	33	84	58	32x3½	Tap. Roll.	No	Yes	1080
Detroit B	3000	132	66	Channel	..	82	56	36x3	Roller	No	Yes	800
Hesse 9	2500	126	38	Channel	32	..	56	30x2½	Bower	....	Yes	....
Hesse 8	3500	120	38	Channel	36½	..	56	32x3	Bower	No	Yes	....
Highway A4	4000	..	..	Channel	15	110	60	36x3½	Roller	No	Yes	885
Hi-Speed Trailercar 20	2000	108	37	Wood	21	72	56	30x3½	Ball	Yes	No	290
Lee T1	2500	120	60	Channel	45	75	56	36x3½	Timken	Yes	Yes	750
Lee T2	4000	144	66	Channel	45	100	58	36x4	Timken	Yes	Yes	1000
Los Angeles D	4000	144	..	I-Beam	38	80	60	36x3½	Roller	....	Opt	750
Lynch 311 (Ford)	4000	144	34	Steel	42	67	56	.....	Plain	....	....	....
Miami 12	3000	138	42	Channel	28	84	56	34x3	Timken	....	No	341.50
Ohio 200D	4000	144	33	Channel	30	96	56	36x3½	Roller	No	Yes	890
Trailmobile C	2000	..	..	Angle	..	62	56	.....	Roller	No	No	....
Trailmobile D	3000	..	..	Channel	..	74	56	32x3	Roller	No	No	....
Troy 110	4000	..	..	Channel	..	83	56¼	36x3	Roller	No	Yes	790
5000 Pound												
Lee D2	5000	156	66	Built-up	25°	120	60	36x4	Timken	Yes	Yes	1200
Warner 51	5000	144	34¾	Channel	..	87¾	56	36x4	Bower	....	Yes	....
6000 Pound												
Columbia 3T	6000	144	72	Channel	..	72	56	36x4	Timken	No	Yes	850
Detroit D	6000	144	72	Channel	..	102	62	36x4	Roller	No	Yes	1200
Hesse 7	6000	132	42	Channel	38½	..	60	34x4	Bower	....	Yes	....
Highway K4	6000	..	..	Channel	15	110	56	36x4	Roller	No	Yes	1185
Highway N4	6000	..	..	Channel	15	110	66½	36x4	Roller	No	Yes	1185
Lee T3	6000	144	66	Channel	45	100	58	36x5	Timken	Yes	Yes	1150
Lee C3	6000	..	..	Built-up	..	96	56	36x6	Timken	Yes	No	1500†
Los Angeles E	6000	144	..	I-Beam	38	80	60	36x4	Roller	....	Opt	950
Lynch 312	6000	144	34	Steel	42	67	56	.....	Plain	....	....	....
Martin	6000	..	..	....	43	..	56	36x4	Martin	No	Yes	830
Ohio 300F	6000	144	34½	Channel	31¼	91	58	36x5	Roller	No	Yes	1145
Troy 212	6000	..	..	Channel	..	83	65½	36x4	Roller	No	Yes	1175
Watson	6000	168	66	Angle	44½	115	60	36x5	Timken	Yes	No	835

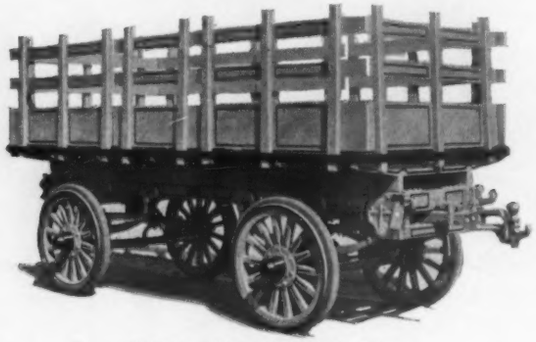
* Pneumatic. ° Center only. This is a drop frame. † Price includes body.



Trailmobile, Model E, 7000 lb.
Trailmobile Co., 538 E. Fifth St., Cincinnati, Ohio.

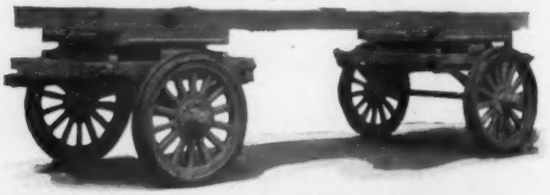


Columbia Model 5T, 10,000 lb., $1350.
Columbia Motor Truck & Trailer Co., Pontiac, Mich.

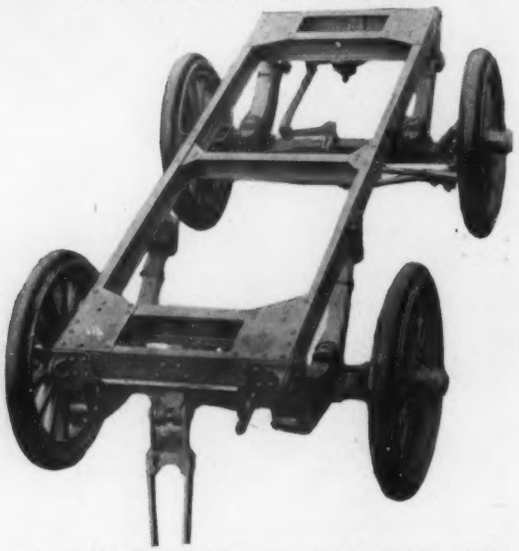


Warner Four-Wheel Trailer.
Made in four capacities: Model 50, 3000 lb.; Model 51, 5000 lb.; Model 52, 10,000 lb.; Model 54, 14,000 lb.
Warner Mfg. Co., Beloit, Wis.

Lee, Model D-6, 12,000 lb. Drop Frame Reversible Trailer, $1800.
With platform specially adapted for hauling heavy machinery. Lee Loader & Body Co., 2343 S. LaSalle St., Chicago, Ill.



Fruehauf Four-Wheel Trailer.
Fruehauf Trailer Co., Detroit, Mich.



Lee, Model T-2, 4000 lb. Four-Wheel Trailer, $1000.
Also made in five other capacities: T-1, 2500 lb., $750; T-3, 6000 lb., $1150; T-4, 8000 lb., $1400; T-5, 10,000 lb., $1500; T-7, 14,000 lb., $1750. Lee Loader & Body Co., 2343 S. LaSalle St., Chicago, Ill.

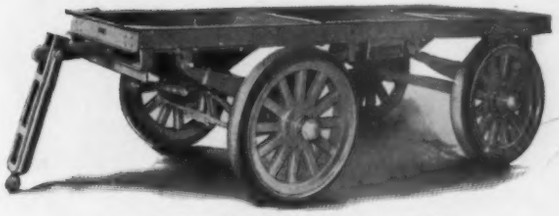
4-W

Trade Name and Model	Capacity	Length of Platform	Width of Platform	Frame	Height of Platform From Ground	Wheelbase	Width of Tread	Tires	Wheel Bearings	Is Body Furnished Standard?	Is Trailer Reversible?	Price
7,000, 8,000 and 9,000 Pound												
Arcadia 352	7000	144	72	Channel	34	84	63	36x5	Tap.Roll.	No	Yes	1360
Lee D3	7000	166	66	Built-up	25*	120	60	36x5	Timken	Yes	Yes	1400
Lee T4	8000	168	72	Channel	45	117	66	36x6	Timken	Yes	Yes	1400
Lee D4	9000	195	72	Built-up	26*	144	66	36x6	Timken	Yes	Yes	1600
Trailmobile E	7000	..	..	Channel	..	88	66½	36x5	Roller	No	Yes	....
10,000 Pound												
Arcadia 502	10000	144	72	Channel	36	84	68	36x6	Tap.Roll.	No	Yes	1640
Columbia 5T	10000	168	72	Channel	..	96	56	36x6	Timken	No	Yes	1350
Detroit D	10000	168	72	Channel	..	125	62	36x6	Roller	No	Yes	1600
Hesse 6	10000	144	42	Channel	40	..	60	36x6	Bower	....	Yes	....
Highway L4	10000	..	..	Channel	15	110	56	36x6	Roller	No	Yes	1585
Highway P4	10000	..	..	Channel	15	110	68⅜	36x6	Roller	No	Yes	1585
Lee T5	10000	168	72	Channel	45	117	66	36x7	Timken	Yes	Yes	1500
Los Angeles G	10000	144	..	I-Beam	38	80	60	36x6	Roller	....	Opt	1350
Lynch 314	10000	144	34	Steel	42	67	56	.....	Plain	....	....	....
Ohio 500F	10000	144	40	Channel	35	90½	68	36x6	Roller	No	Yes	1680
Reliance	10000	144	38	Channel	38	78	58	36x6	Roller	No	....	1330
Troy 512	10000	..	..	Channel	..	83	65½	36x7	Roller	No	Yes	1750
Watson	10000	168	66	Angle	44½	115	60	36x7	Timken	Yes	No	1035
12,000 and 14,000 Pound												
Detroit D	14000	168	78	Channel	..	116	63	36x7	Roller	No	Yes	1850
Lee C6	12000	..	..	Built-up	..	96	60	36x5D	Timken	Yes	No	2000†
Lee D6	12000	207	72	Built-up	28*	156	66	36x7	Timken	Yes	Yes	1800
Lee T7	14000	168	78	Channel	45	117	66	36x8	Timken	Yes	Yes	1750
Lynch 411	12000	144	34	Steel	42	83	64	.....	Plain	....	....	....
Martin	12000	..	..	....	43	..	58	36x5	Martin	No	Yes	1120
Warner 54	14000	156	37	Channel	..	98	64	36x7	Bower	....	Yes	....
20,000 and 30,000 Pound												
Lynch 412	20000	144	34	Steel	42	83	64	.....	Plain	....	....	....
Lynch 512	30000	480	34	Steel	42	86	70	.....	Plain	....	....	....
Lynch 511	30000	144	34	Steel	42	83	70	.....	Plain	....	Opt	....
Martin	20000	..	..	Opt	43	..	60	36x6	Martin	No	Yes	1420

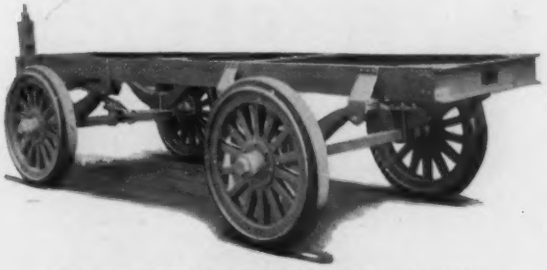
† Price includes body.
* Center only. This is a drop frame.

Troy Model 512, 10,000 lb. Trailer, $1750.
Troy Wagon Works Co., Troy, Ohio.

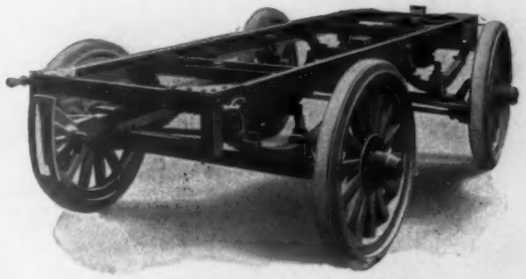
Watson 10,000 lb. Platform Chassis, $1035.
Watson Wagon Co., Canastota, N. Y.



Los Angeles Model G, 10,000 lb., $1350.
Made in two other sizes: D, 4000 lb., $750, and E, 6000 lb., $950. Los Angeles Trailer Co., 1328 Palmetto St., Los Angeles, Cal.



Reliance 10,000 lb. Four-Wheel Trailer, $1330.
Also make other sizes, ranging from 1500 lb. to 20,000 lb. capacity. Reliance Trailer & Truck Co., Inc., 30 Eighth St., San Francisco, Cal.

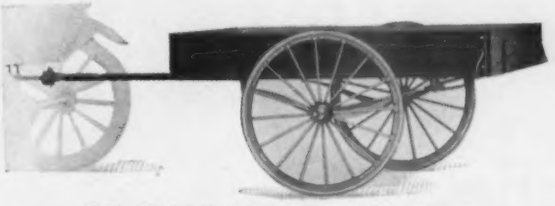


Arcadia Model 502, 10,000 lb., $1640.
Brakes furnished when required; automatic draw-bar lock, operated outside of frame; Smith wheels extra. Arcadia Trailer Corp., Newark, N. Y.

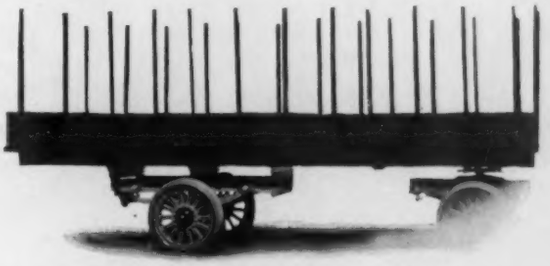
Trailers for Which Complete Specifications Were Not Available

Gem City Trail-O-Car, Model 63H, 1500 lb.
Meeker Mfg. Co., Linden & Huffman Aves., Dayton, Ohio.

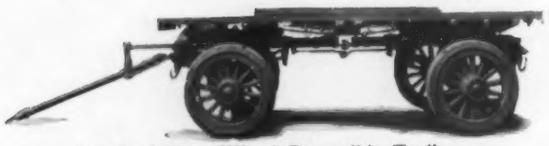
King Two-Wheel Trailer.
Made in 1200 and 1500 lb. capacities. King Trailer Co., Ann Arbor, Mich.



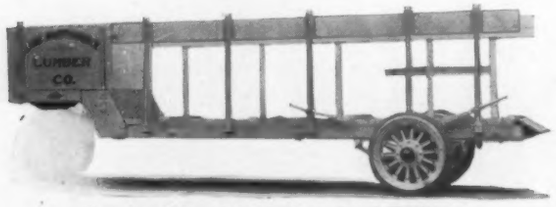
E-B, Model 7, 600 lb., Two-Wheel Type.
Also make a Model 4, 750 lb. capacity; both have ball-bearing axles. Emerson-Brantingham Implement Co., Rockford, Ill.



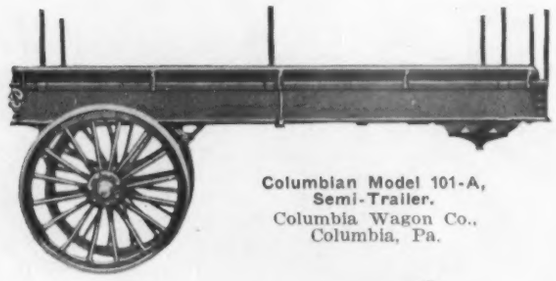
Bethlehem Fifth-Wheel Type Semi-Trailer.
Capacity 5 tons; furnished on order to go with 2½-ton Bethlehem truck; 6-ton trailer furnished for 3½-ton truck. No specifications are given of this model in Specification Table. Bethlehem Motors Corp., Allentown, Pa.



Shadbolt Four-Wheel Reversible Trailer.
This trailer is so constructed that either gear can be held rigidly so that if one gear is held rigidly the other revolves around a king bolt as does the ordinary horse-drawn vehicle. This permits short turning. Shadbolt Mfg. Co., Brooklyn, N. Y.

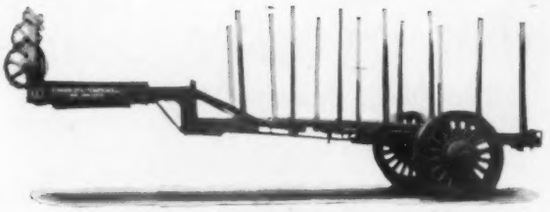


Fruehauf Special Lumber Semi-Trailer.
Fruehauf Trailer Co., Detroit, Mich.

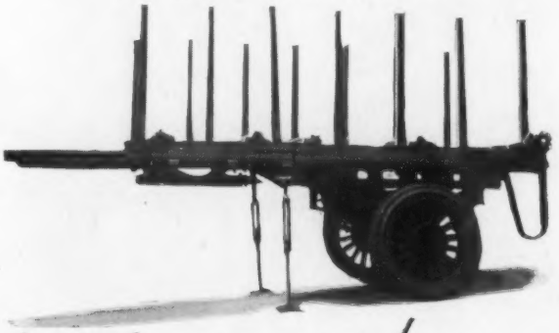


Columbian Model 101-A, Semi-Trailer.
Columbia Wagon Co., Columbia, Pa.

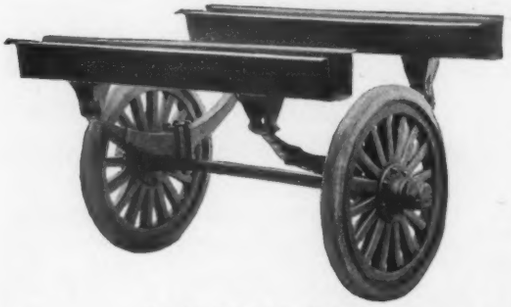
Highway Four-Wheel Trailer with Special All Steel Dump Body.
Highway Trailer Co., Edgerton, Wis.



Shadbolt Semi-Trailer with Winch.
Shadbolt Mfg. Co., Brooklyn, N. Y.



Shadbolt Lumber Semi-Trailer.
This trailer will carry lumber in lengths from 9 to 35 ft. The upper view shows the trailer close-coupled while the lower view shows how it can be lengthened out, also the dumping feature of the rear unit. Shadbolt Mfg. Co., Brooklyn, N. Y.



Martin Rear End Assembly.
For converting any platform type wagon into a semi-trailer; made in five sizes: 2000 lb., $250; 3000 lb., $275; 4000 to 6000 lb., $560; 8000 to 12,000 lb., $710, and 16,000 to 20,000 lb., $865. Martin Rocking Fifth Wheel Co., 23 Besse Pl., Springfield, Mass.

List of Trailer Makers Arranged Alphabetically According to Trade Name

Arcadia	Arcadia Trailer Corp., Newark, N. J.
Auto-Kamp	Auto-Kamp Equipment Co., 2000-2008 Sheridan Ave., Saginaw, Mich.
Bethlehem	Bethlehem Motors Corp., Allentown, Pa.
Columbia	Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Columbian	Columbia Wagon Co., Columbia, Pa.
Defiance	Defiance Carriage Co., Cor. Perry & Gorham Sts., Defiance, O.
Delker	Geo. Delker Co., Henderson, Ky.
Detroit	Detroit Trailer Co., Inc., 553-65 Stanley Ave., Detroit, Mich.
E-B	Emerson-Brantingham Implement Co., Rockford, Ill.
Fowler	Fowler's Garage & Machine Works, Inc., 1414 Broadway, Seattle, Wash.
Fruehauf	Fruehauf Trailer Co., 1315 Gratiot Ave., Detroit, Mich.
Gem City	Meeker Mfg. Co., Linden & Huftman Ave., Dayton, O.
Trail-O-Car	
Harper	Harper Buggy Co., Columbia City, Ind.
Hesse	Wm. G. Hesse & Sons Mfg. Co., Leavenworth, Kan.
Highway	Highway Trailer Co., Edgerton, Wis.
Hi-Speed	Northway Trailer Co., E. Rochester, N. Y.
Hoof	Hoof Bros. Mfg. Co., Plato, Minn.
Hopp	Hopp Carriage Co., 4th & Walnut Sts., Mifflinburg, Pa.
Hummer	Hummer Vehicle Works, Chicago Heights, Ill.
King	King Trailer Co., 701 Main St., Ann Arbor, Mich.
Lapeer	Lapeer Tractor-Truck Co., Lapeer, Mich.
Lee	Lee Loader & Body Co., 2335-2350 S. LaSalle St., Chicago, Ill.
Los Angeles	Los Angeles Trailer Co., 1328 Palmetto St., Los Angeles, Cal.
Lynch	Lynch Mfg. Co., Hammond, Ind.
Martin	Martin Rocking Fifth Wheel Co., 244 Main St., Springfield, Mass.
Menning	Texas Wagon Works, 101 Crawford St., Houston, Tex.
Miami	Miami Trailer Co., Troy, O.
Miles	Miles Mfg. Co., 351 S. Park St., Jackson, Mich.
Minute	J. H. Whetstone & Co., Lapeer, Mich.
Ohio	Ohio Trailer Co., Nottingham Road & N. Y. C. Railroad, Cleveland, O.
Reliance	Reliance Trailer & Truck Co., Inc., 30 8th St., San Francisco, Cal.
Rogers	Rogers Bros. Co., Albion, Pa.
Samson	Samson Trailer Corp., 737 Bond Ave., Grand Rapids, Mich.
Shadbolt	Shadbolt Mfg. Co., 68-78 Flushing Ave., Brooklyn, N. Y.
Standard	Standard Trailer Co., Cambridge Springs, Pa.
Studebaker	Studebaker Corp., South Bend, Ind.
Trailer Truck	Trailer Truck Co., Nashotah, Wis.
Trailmobile	Trailmobile Co., 538 E. 5th St., Cincinnati, O.
Troy	Troy Wagon Works, Race & Walnut Sts., Troy, O.
Victor	Victor Motor Truck & Trailer Co., 401 N. Wayne Ave., Chicago, Ill.
Warner	Warner Mfg. Co., 146 Bushnell Ave., Beloit, Wis.
Watson	Watson Wagon Co., 121 Center St., Canastota, N. Y.
Woonsocket	Woonsocket Wagon Mfg. Co., Woonsocket, Wis.

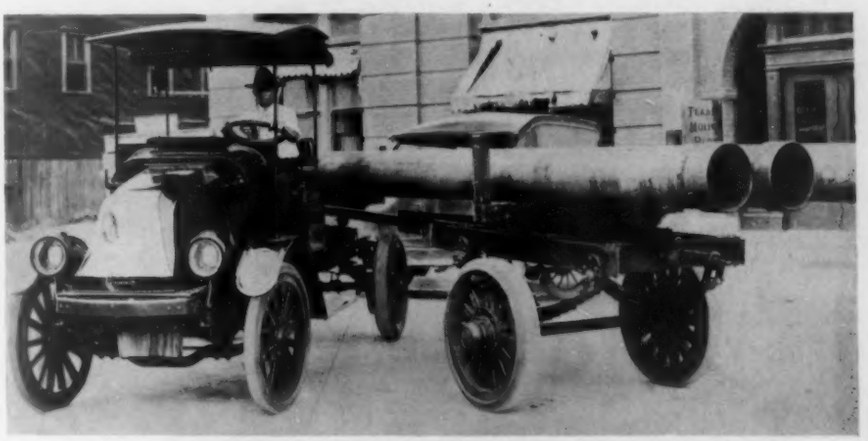
King Pole and Semi-Trailers

THE King Trailer Co., of Ann Arbor, Mich., specializes in two-wheel trailers, of pole and semi-type. This company's long experience in the manufacture of trailers has convinced it that the two-wheel trailer meets the greatest number of hauling conditions. Tests and investigations have convinced the King Company that the average truck supplies draw-bar pull sufficient to haul about three times as much as it can carry. A truck rated at 1-ton carrying capacity will handle a semi or pole trailer with three times this load, or three tons. And this load on the trailer will be taken care of under practically all the conditions under which the truck alone could carry one ton. For the same reason a 2-ton truck would handle a six-ton load, and a 3-ton truck a nine-ton load under normal conditions. It recommends, therefore that the trailer selected should be rated at two or three times the capacity of the truck, to be used as a tractor. As the King fifth wheel attachment is necessary with the semi-trailer, it is recommended that this be placed over or directly in front of the truck's rear axle.

Special attention is called to the load distribution of the King trailer. The axles are placed carefully, in order that only 30 per cent. of an evenly placed load will be supported by the tractor truck. This is sufficient to insure traction of the whole unit and yet make it impossible to put an excessive strain on the trucks. This design permits 70 per cent. of the weight to be borne by the dead axle of the trailer, so that the trailer bears the burden of the weight. This company states that the use of the proper trailer with the truck adds less than 50 per cent. to the maintenance cost of the truck alone, that a continual saving of 10 to 20 per cent. in comparison to a single truck of the same capacity as the six-wheel unit, is the result.

Experience has shown the King company that in order for them to advise fully as to the proper trailer and attachment for any truck, it is necessary for them to have the rated capacity of truck, the width of the frame over the rear axle, the length of the frame behind the center line of the rear axle, and the height of the top of the frame from the ground, both free and under average load. It is also occasionally advisable to cut off the rear of the truck frame in order to make it a satisfactory tractor for all road conditions.

Appropriate standards for each trailer are supplied when ordered. The King fifth wheel makes it necessary to lift the front of the trailer but slightly. This short raise is effected and the standards set in position after lowering, by backing the equipment a few inches. Standards are adjustable and should be set to barely touch the ground when the truck and trailer are empty.



The King Pole Trailer Hauling a Load of Heavy Pipe
This illustration shows the adaptability of the King Pole Trailer to turning and backing in close quarters. The pole trailer is built in 1½, 3½ and 5 ton models

The King Fifth Wheel

The King fifth wheel should be bolted to the tractor-truck frame over its rear axle, or directly in front of it. Four plates are furnished for the attachment. The fifth wheel frame is standard in 34-in. width. Other widths may be secured if ordered.

The success of truck and trailer equipment depends upon the fifth wheel connection. The exclusive shock absorbing, universal motion, stabilizing, and quick coupling and uncoupling features of the King fifth wheel makes its use essential, whatever type of semi-trailer is operated.

The operation of the King fifth wheel is very simple, and is especially valuable when trailers are to be operated in relays. To uncouple, the socket knuckle is released by pulling out the locking rod. The truck drives out from under, leaving the trailer supported by its standards. To couple, the truck backs so that the ball on the trailer strikes any point of the twelve-inch mouth of the fifth wheel on the truck. Continuing to back, the ball slides into its socket, where it is held fast by the socket knuckle, after operating the locking rod.

The King Semi-Trailer Doing Some Heavy Hauling
This illustration shows the truck and trailer ready to start out with a capacity load. This trailer is furnished in 1½, 2, 3 and 5 ton sizes

King Pole Trailers for Hauling Long Material

The King pole trailer is essential for hauling long material. It is fitted with an adjustable pipe reach providing for a length from six to eighteen feet from the trailer bolster to the end of the reach.

For light loads, or when the trailer is to be used only occasionally, the front of the trailer reach may be hooked to the rear of the truck frame. A simple wooden bolster, No. SB-1, is placed on the truck platform over the axle of the truck and allowed to turn on its king pin, which passes through the floor. The load extends from this bolster to the trailer bolster, for which also a second SB-1 should be especially ordered. It is evident that the trailer attached in this way and the load have different turning centers. The trailer reach, therefore, is allowed sufficient play, controlled by heavy springs, to take care of the variation in distance between the truck and trailer bolsters, when the equipment is turned.

For continual use or for heavy loads, the fifth wheel bolster, No. FDS-3,

should be attached to the truck frame directly over the rear axle. The trailer reach in this case is fastened permanently to the fifth wheel bolster, by means of attachments. This insures the same turning centers for both trailer and load. The fifth wheel bolster provides shock absorption as well as free turning facilities. To uncouple, the bolster part of the fifth wheel and ball bracket are removed entirely in the same way as indicated in the above description of the King fifth wheel.

Special Bodies

Any type of body may be used on King semi-trailer chassis. Lattice stake is standard. If a different type is desired, information may be secured from the King Trailer Company. The King semi-trailer may be fitted to the requirements of any business.

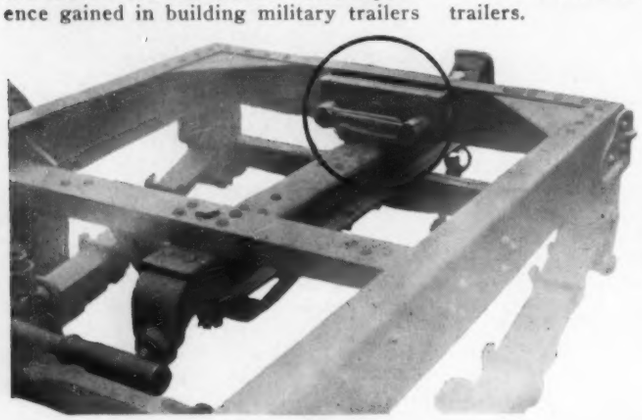
Announces Complete Line of Ohio Trailers

The return of peace time conditions finds the Ohio Trailer Co., of Cleveland, Ohio, with greatly increased capacity, ready to swing into big production with an improved line of trailer models, ranging in size from the three-quarter ton, two-wheel automobile trailer, to the five-ton tractor or truck trailer. The experience gained in building military trailers has been used profitably, and a number of new exclusive features are included in these models.

Truck Practice Followed Throughout

In the construction of the new models the best practices in truck building have been followed. The frame is of pressed steel and is built with tapered ends. The greatest strength is thus secured in the center of the frame where it is needed most, and this design also permits greater flexibility in the chassis, consequently assuring longer service from the tires.

By mounting the frame as low as possible a low center of gravity is secured, and side sway is eliminated to a very great degree. The drawbar assembly is new. It contains a compression spring for absorbing the shocks encountered in starting and stopping. It is of the bumper-head type, which permits the successful use of trailers and trains, and has large coupling bearings to eliminate wear and the consequent "snaking" of trailers.



Showing the Positive Action, Automatic Drawbar Locking Device Used on Ohio Trailers.

The Ohio trailer drawbar also has an entirely new feature, being built of heavy pressed steel U-section, insuring against breakage by careless operators. It is packed with grease and if properly lubricated once every six months, should last indefinitely.

The Two-Ton Ohio Trailer

Ten-Ton Ohio Trailer. One of the Types Furnished to the Government

This particular model was used for hauling tractors from the supply base up to the scene of action, thereby saving considerable wear on the tractor and assuring its arrival where needed in much less time

Lubrication Practically Automatic

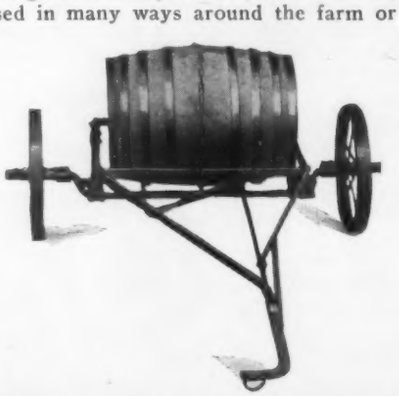
The automatic locking device used on the drawbar has the working parts enclosed in a grease-tight housing. This housing is filled with a mixture of graphite and grease, and the supply is sufficient to last for at least a year. Proper lubrication of the moving parts and bearings is assured with minimum care.

Practically all bushings are of the oilless type; bronze impregnated with graphite. These bushings are guaranteed to be self-lubricating for the life of the vehicle.

All axle parts are properly heat treated to insure against breakage. The steering knuckles are of nickel steel. The wheels are of artillery type, S. A. E. standard. The tires are solid; oversize, pressed-on type. For complete specifications of the various models see Trailer Review in this issue.

The K-D Transport. Will Carry up to 700 Pounds

The Skreberg Mfg. Co., Milan, Minn., builds the trailer illustrated above. This is a general utility vehicle, which can be used in many ways around the farm or



The K-D Transport. For Carrying Barrels or Boxes up to 700 Pounds in Weight

as a transportable base for demonstrating lighting plants, cream separators, small fire apparatus, etc. For road work it is fitted with pneumatics and ball bearings. The pneumatics specified are United States 36 x 3 in., airplane type. The frame is made up of round-edge steel. The cradle frame is made to fit a standard 55-gal. barrel. The drawbar is offset so that the trailer can be readily attached to one side of the rear axle. The height of the platform from the ground is 18 in.

Truck and Trailer Outfit Simplifies Hauling Problems of Essex Foundry Company

Five-Ton Pierce-Arrow Truck is Still Giving Service After Five Years' Use. Trailer Has Been in Use Three Years. Accurate Cost Record Kept by Company

WHEN a large corporation, one employing an expert accountant to keep accurate record of costs, continues to use the same motor truck for approximately five years, it is a flattering testimonial to the efficiency and dependability of the car. And when a trailer added to the equipment, meets every requirement for which it was intended during the three years it has been used, it may be assumed that it has the endorsement of the man who analyzes the cost figures.

Nearly five years ago the Essex Foundry Co., on the outskirts of Newark, N. J., invested in a 5-ton Pierce-Arrow truck on the recommendation of T. T. Reilly, who was, and still is, in charge of its transportation department. The company manufactures soil pipe, fittings, steam pipe, flanges, etc., and was, up to a recent date, a very large producer of soil pipe; in fact, soil pipe was 75 per cent. of the output of the foundry. This material is long, bulky and heavy.

The truck was utilized to distribute to the wholesale houses in New York, Brooklyn and points on Long Island, and frequently made two round trips daily to Brooklyn, averaging 27 miles a day in the delivery work. From the start the principle of the "return load" was practiced, arrangements being made with a large manufacturing company in Brooklyn to haul its material to Newark, and, as a general rule, the truck returned with a capacity load.

Investment Brings Results

During the first two years of service the returns on the investment were highly satisfactory, but T. T. Reilly, after carefully analyzing the problem, suggested the use of a trailer. He prevailed upon the company to permit of a demonstration of sufficient duration to thoroughly test the practicability of the trailer. It is understood that the accountant was somewhat interested.

The trailer selected was a 5-ton Troy, which, on its first day in service with the truck, hauled three capacity loads of 10 tons to Brooklyn. It made another trip, one involving the delivery of a capacity load over a distance of 50 miles—after which the driver of the truck reported that when he found he could make his turns and cut sharp corners easily, he "forgot the trailer and went right along on his business." The company purchased the trailer. That was three years ago and the trailer is still on the job. It follows the truck to New York, Brooklyn, and to distant points on Long Island and in New Jersey.

The Pierce-Arrow Five-Ton Truck Has Nearly Five Years' Operation to Its Credit and is Still Giving Excellent Service.

Loading Methods a Handicap

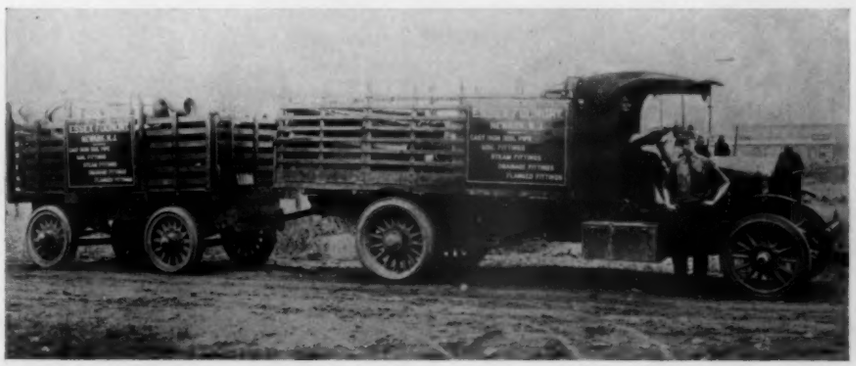
At the present time the company has no well-defined plan of loading, owing to the disorganized conditions obtaining upon the completion of government work. Sometimes the trailer is loaded at night, and made ready for an early start in the morning with the truck. Then again both the truck and trailer are loaded in the morning or during the day, two gangs of men being utilized and accomplishing the work in about 45 minutes. The smaller material is barrelled and easy to handle while some is bulky, such as pipe, and is not conducive to fast loading. These conditions have a bearing on the cost figures or charges against the transportation equipment.

It should also be mentioned that the loading platform does not make for economy and that in many instances the material is brought from different sections of the plant and grounds. This, the writer was given to understand, is to be corrected now that the government work is completed.

Equipment Idle Many Days

In determining the costs of transportation, the accountant charges against the equipment its proportional share of the overhead and other expenses and credits the trailer and truck on a tonnage basis; that is, the equipment is credited work at the cost of horses. This method has obtained from the outset and up to the past year has resulted in large earnings for the truck and trailer. The past season has not been productive of large earnings because the equipment was idle many days, during which time the overhead was busy.

Accompanying figures are those for the month of September and represent an average month of the past fiscal year. The truck was in service 20 days and the trailer but nine. The former traveled 665 miles and hauled 147.6 tons while the trailer transported 50.6 tons 335 miles, a total tonnage of nearly 198 tons. The figures show that the cost of fuel, oil and grease was $78.70 and that $158.17 was charged for the driver and helper. There is also a charge of general indirect labor at $39.69, and a charge of $36.33 (the proportional share of the superintendent, foreman, etc.), and ferriages amounting to $42.56.



A Five-Ton Pierce-Arrow Truck and Five-Ton Troy Trailer Which Solved the Transportation Problems of the Essex Foundry Company

Repairs to the truck are estimated at 4 cents a mile and tires at 6 cents a mile. Tires for the trailer are charged at 6 cents a mile. Depreciation figures show a charge of $95.83 for truck and trailer a reserve, and $72.67 for general expenses, including interest on the investment, insurance, rent, water, etc. The electric light bill is 79 cents. The life of the truck is figured at 5 years.

Figured on the tonnage basis it cost slightly over $3 a ton and the accountant informed the writer that this was the cost of hiring horse-drawn equipment at the present time. The expert admitted that the non-use of the equipment was responsible for the comparison. He also stated that for four years the balance had been on the right side of the ledger and that even at the present time the truck and trailer were indispensable.

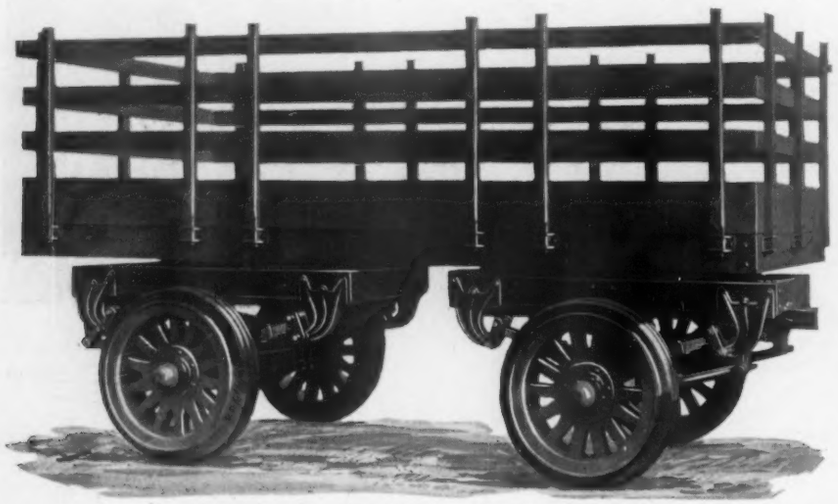
The figures, which do not include earnings of truck and trailer on the return loads plan, are cited to show the methods employed by some large concerns, and in this case it would appear that the accountant had not overlooked any possible charge. It is assumed that, were the hired horse-drawn equipment to be used, some of the charges against the truck and trailer would be diverted to other channels. With business on a normal operating basis and new loading methods there is every reason to believe that the truck and trailer will again show good earnings on a tonnage basis.

Operating and Maintenance Costs, Truck and Trailer

315 gal. gasoline at 24 cents	$75.60
5 gal. cylinder oil at 60 cents	3.00
Grease	.10
Driver and helper	158.17
General indirect labor	39.69
Share of superintendent, foreman, etc.	36.33
Ferriages	42.56
Repairs, 665 miles at 4 cents	26.60
Reserve, depreciation truck and trailer	95.83
Tires, truck: 665 miles at 6 cents	39.90
Tires, trailer: 345 miles at 4 cents	13.80
Electric light	.79
General expenses, interest, insurance, rent, water, etc.	72.67
	$605.04

New Fruehauf Reversible Four-Wheel Trailer

The Fruehauf Trailer Co., of Detroit, Mich., has just announced a new trailer, job designed, especially for heavy haulage work. In this new four-wheeled trailer two of the oldest principles used in the construction of various types of heavy haulage vehicles, such as freight cars and street cars, have been adopted.



The New Freuhauf Trailer Has Double Trucks

The first of these is the use of double trucks, or two identical, independent and reversible sets of running gear, for carrying the frame.

The second radical departure from previous designs of trailer construction is the introduction of the circle-steer principle—also used on virtually all forms of heavy haulage units excepting only self-propelled vehicles, to which it is not applicable.

In addition to simplifying the construction and giving a far greater sturdiness to the trailer unit, the application of these two principles is said to eliminate the danger of the trailer "snaking"—in other words, failure to track with the truck, with the resultant terrific jerking strains and stresses on the truck and its power plant.

Additional features of interest are the superior cushioning of the load made possible by the use of double trucks, or gears, under the frame, and the fact that the foundation for any type of body is built in the frame itself.

The springs are relieved of all strain of hauling the load—the load being pulled through the dead square axle of the front truck under the frame. Radius rods absorb all "thrust," further relieving the springs of any strain other than that of cushioning the load. The construction of the double trucks permits the big springs being placed approximately eleven inches farther apart than is customary, thus providing more resiliency and cushioning power, and enabling the axles to carry in the neighborhood of 1000 lb. greater weight.

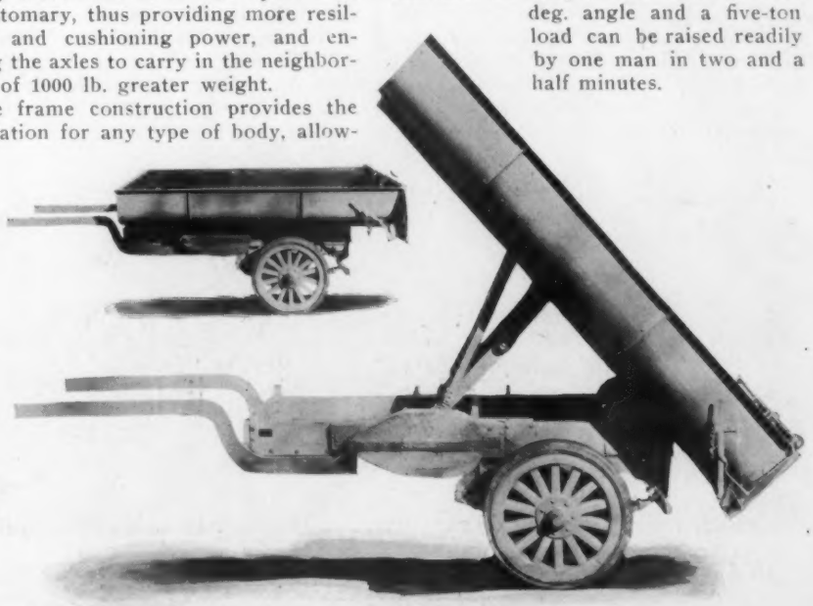
The frame construction provides the foundation for any type of body, allowing the floor to be built flush with the top of the channel frame, and adding to the strength and rigidity of the frame itself. This construction enables the owner to build the ordinary stake and rack body at approximately one-fifth of the customary cost of such bodies.

Woonsocket Semi-Trailer With Dumping Body

The Woonsocket Wagon Mfg. Co., of Woonsocket, R. I., is building a four-wheel trailer as well as a semi-trailer, with an especially designed dumping body for same. The latter outfit can be put to a variety of uses, as it can be placed and turned in any position.

The bodies are made in different sizes and styles, and can also be made to rear elevate, so that the rear end of the body will be lifted about 6 ft. above the ground level. The most used type seems to be the all-steel body, with the tailboard hinged from the top.

The accompanying illustration shows a Woonsocket semi-trailer, one of the many types used by the City of New York. This particular one is used by the Municipal Asphalt Plant for carrying hot asphalt. The advantage of the hoist, which is hand operated, is the fact that the body can be lifted at a 60 deg. angle and a five-ton load can be raised readily by one man in two and a half minutes.



The Woonsocket Semi-Trailer With Hand-Operated Dumping Body

Pneumatic Truck Tires Make Logging Possible in Florida

Pneumatic truck tires have made it possible for the Mickler Lumber Co., of Thonotosassa, Fla., to do away with log hauling by the old, slow mule method and to install two International motor trucks on this job. The roads between the logging camp and the mill, a distance of about twelve miles, are rough and of deep sand over two-thirds of the distance, and while the old southern mule could drag light loads through this sand, a motor truck would have stalled unless equipped with the big pneumatic tires. The company found that even the trailer could not be operated economically with solid tires, so put pneumatics on it also.

With the mules two trips a day could be made, hauling about 2000 ft. of lumber in log form, and with the trucks over 6000 ft. are hauled per day. Not only is more timber hauled, but it is hauled cheaper.

A speed of 15 m.p.h. is maintained on the pneumatic tires, even over the bad roads, and the Mickler company is getting out more timber with less cost than ever before.

The rear truck wheels and the trailer are equipped with 36 x 6 in. Goodyear pneumatics, and the front wheels with 36 x 5 in. tires of the same make.

The Truck and Trailer are Equipped With Pneumatic Tires

The Utility Lumber Trailer

An accompanying illustration shows a Ford truck handling a 3-ton Utility trailer, built by the Los Angeles Trailer Co., Los Angeles, Cal. This trailer is built especially for lumber delivery. It is equipped with four rollers and ratchet cinches, which bind the lumber securely in place. Attention is called to the coil springs over the rear axle. These coil springs are used in the place of the elliptic, to allow the lumber to be dumped to the ground without obstruction. The semi-trailers rest on the truck pivoted on a specially designed fifth-wheel, made by this company.

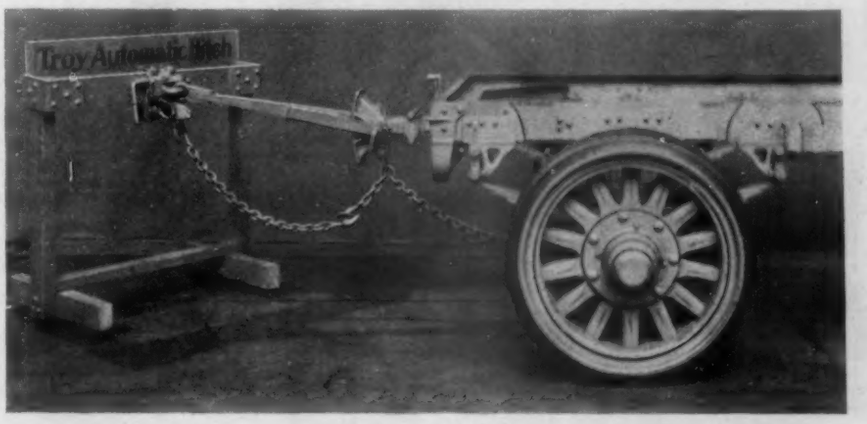
A great many of these trailers are being successfully operated by western retail lumbermen, and they have greatly reduced delivery costs.

Utility Three-Ton Lumber Trailer Attached to a Ford
Note coil springs over the rear axle

Superb Manufacturing Company to Make Trailers

Superb Mfg. Co., Monticello, Ind., announces that it is increasing its plant facilities by the erection of a building. This unit will have 20,000 sq. ft. of floor space. The company has under construction a line of light and heavy trailers, which it will put on the market, in addition to its regular lines of automobile and motor truck parts and accessories.

Empire Axle Co., Dunkirk, N. Y., recently declared bankrupt, has entered into a contract with the Watson Wagon Co. for the sale of all its assets, consisting of real and personal property, valued at $20,000.

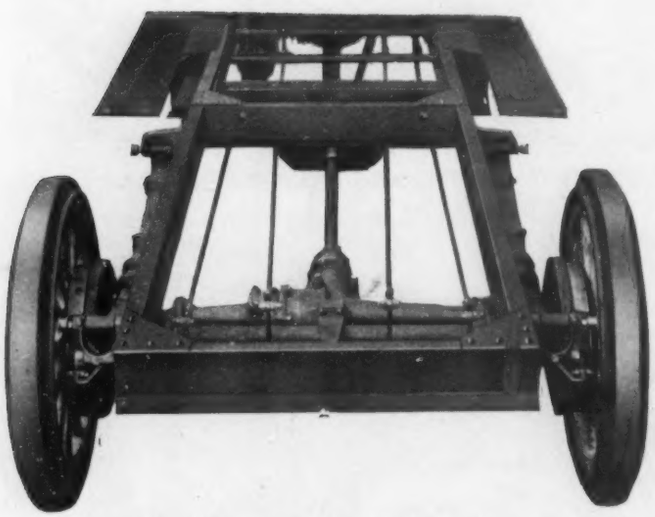


A Convenient Method of Demonstrating a Trailer Hitch

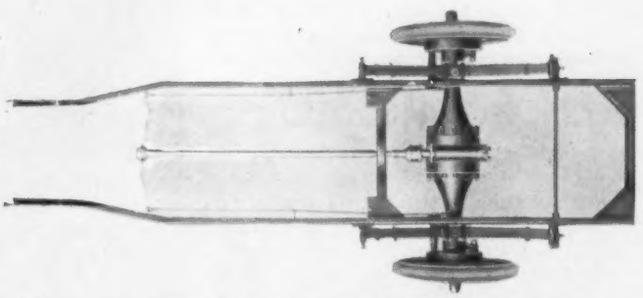
Among the many questions asked by the trailer prospect is how the trailer is secured to the truck. As it is not always convenient to make actual demonstrations, especially if the trailer is displayed in the salesroom of limited space, the display of the Troy trailer at the recent New York commercial car show is suggestive. George Cline, Jr., manager of the New York branch of the Troy Wagon Works, constructed a frame on casters to illustrate the rear cross-frame member of the truck and attached to this part the Troy automatic hitch. This affords a practical method of demonstrating the hitch.

A Review of Truck Units for Converting Passenger Cars Into Commercial Cars

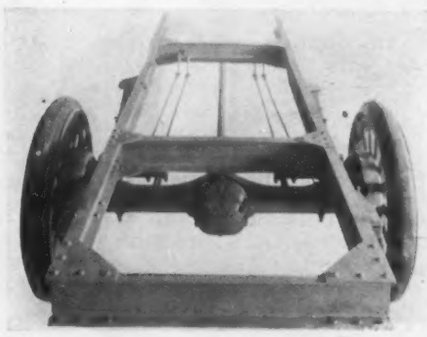
Note: This review contains only such units which either replace the entire rear axle of the passenger car or provide a new axle for carrying the load. Extensions, etc., are not included



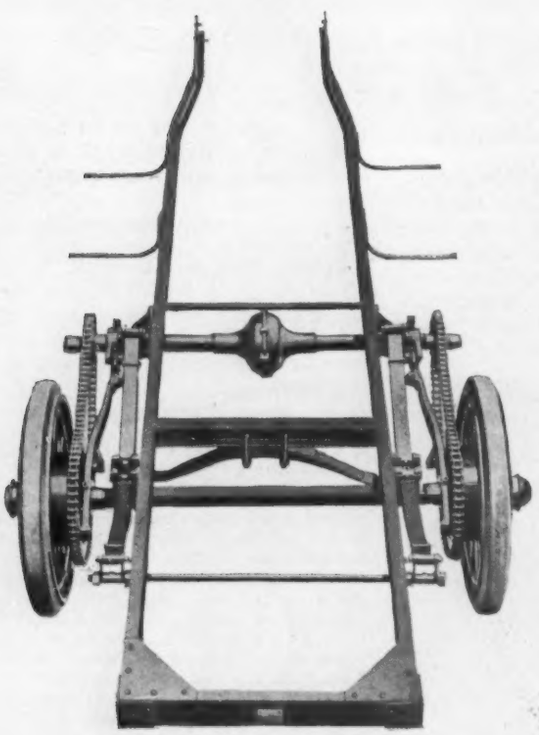
All Car, Model B, 4000 lb. Unit for Any Car.
This unit is attached to an Overland. All-Car Unit Co., Real Estate Trust Bldg., Philadelphia, Pa.



Ameston Unit for Fords or Any Car.
Made in two models: Model 20, 3000 lb., $475, and Model 44, 4000 lb., $485. F. A. Ames Co., Inc., Owensboro, Ky.

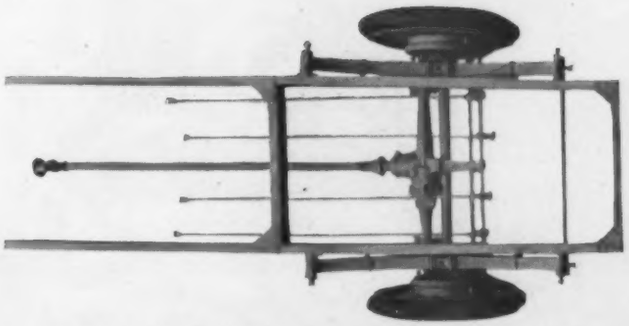


Burman 3000 lb. Truck Unit for Dodge Cars, $625.
This firm also makes units for the Ford and any car. Chas. W. Burman, 3074 Broadway, Oakland, Cal.



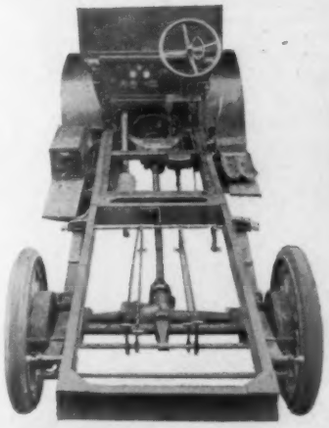
Ferguson, 2000 lb. Unit for Fords.
Blount Carriage & Buggy Co., Atlanta, Ga.

Dearborn Universal 4000 lb. Unit for Any Car, $550.
Made also in 2000 lb. capacity, which sells at $450. Dearborn Truck Co., 2015-17 S. Michigan Ave., Chicago, Ill.

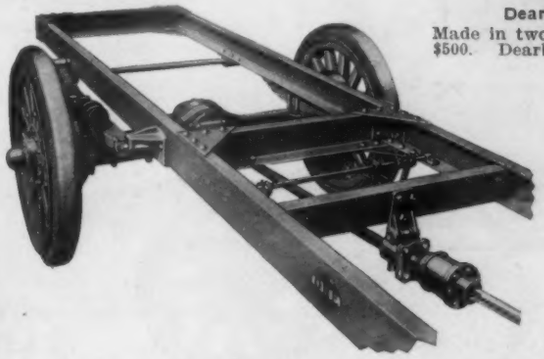


Detroit Universal Unit, Model C, 4000 lb. Capacity, $560.
Carrier Motor Truck Co., 1685 Gratiot Ave., Detroit, Mich.

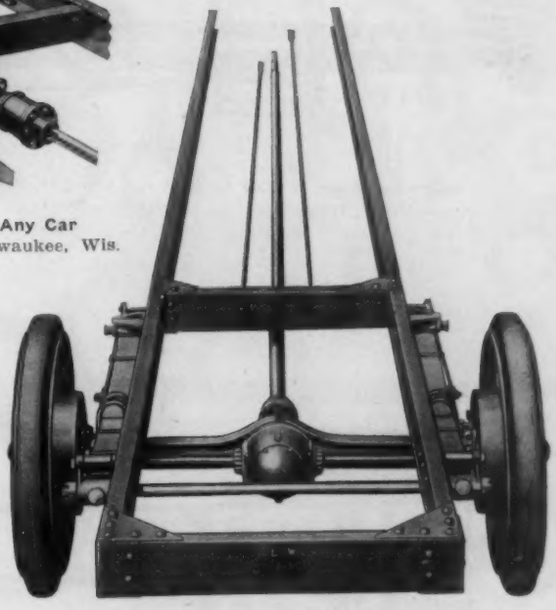
Dearborn Smith Form-A-Truck for Fords.
Made in two capacities: 2000 lb., at $400, and 4000 lb., at $500. Dearborn Truck Co., 2015-17 S. Michigan Ave., Chicago, Ill.



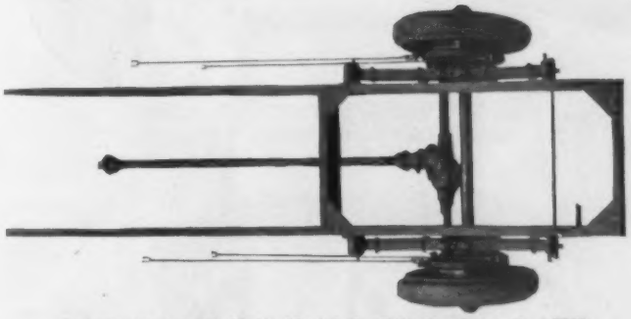
All Car, Model B, 4000 lb. Unit for Any Car.
This unit is attached to a Hudson.
All-Car Unit Co., Real Estate Trust Bldg., Philadelphia, Pa.



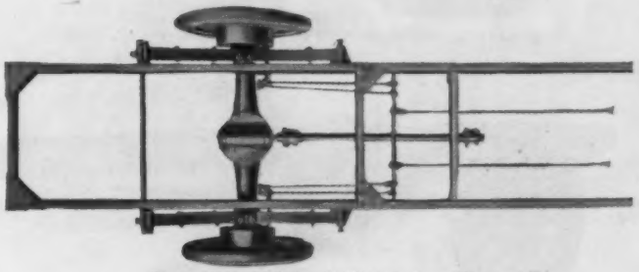
E and W Internal Gear Drive Unit for Any Car
E and W Mfg. Co., 340-50 Oregon St., Milwaukee, Wis.



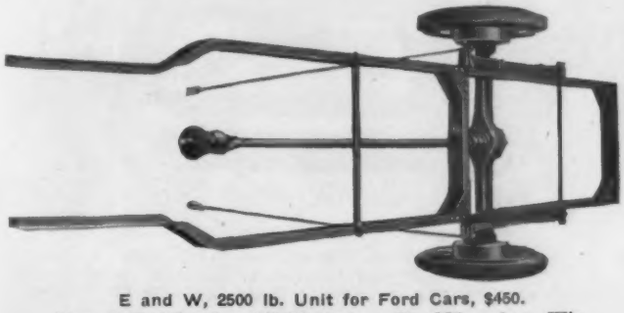
E and W, 3000 lb. Internal Gear Unit for Dodge Cars, $500.
E and W Mfg. Co., 340-50 Oregon St., Milwaukee, Wis.



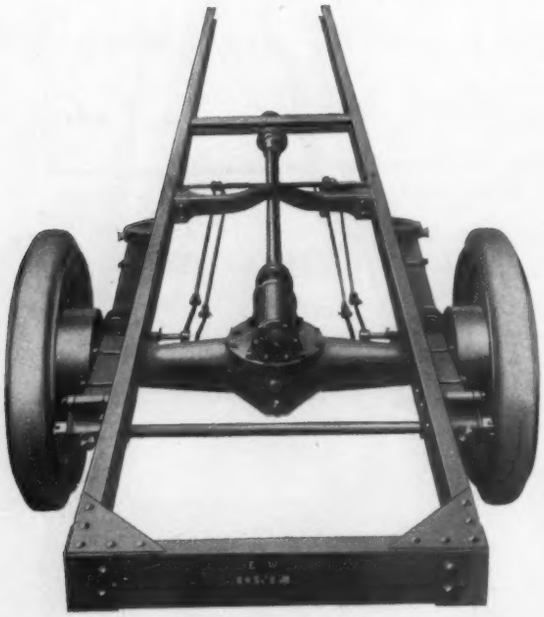
Detroit Universal Unit, Model D, 6000 lb. Capacity, $705.
Carrier Motor Truck Co., 1685 Gratiot Ave., Detroit, Mich.



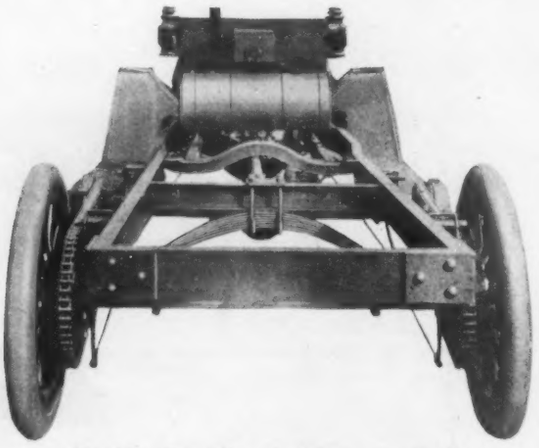
E and W, 4000 lb. Unit for Any Car
E and W Mfg. Co., 340-50 Oregon St., Milwaukee, Wis.



E and W, 2500 lb. Unit for Ford Cars, $450.
E and W Mfg. Co., 340-50 Oregon St., Milwaukee, Wis.



E and W 4000 lb. Truck Unit for Any Car, $625.
E and W Mfg. Co., 340-50 Oregon St., Milwaukee, Wis.

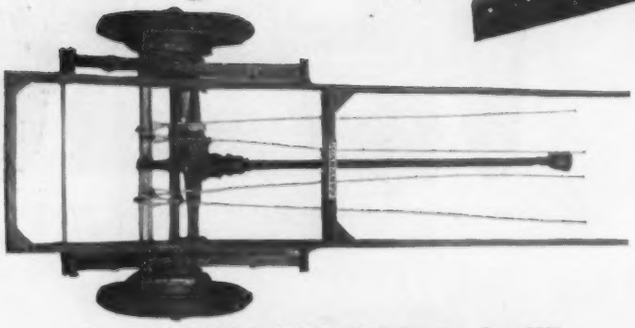


Franklin Two-Way Converter for Fords.
Franklin Two-Way Converter Co., Chicago, Ill.

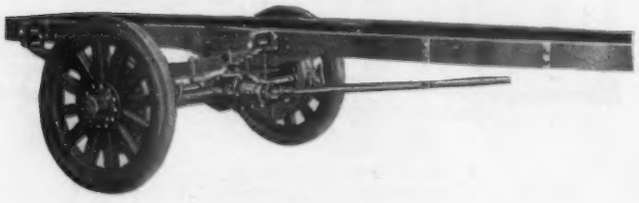
Guaranty, Model Y, 2000 lb. Unit for Fords, $440.
Guaranty Motors Co., Cambridge, Mass.

Guaranty Model O, 2500 lb. Unit for Any Car, $440.
Guaranty Motors Co., Cambridge, Mass.

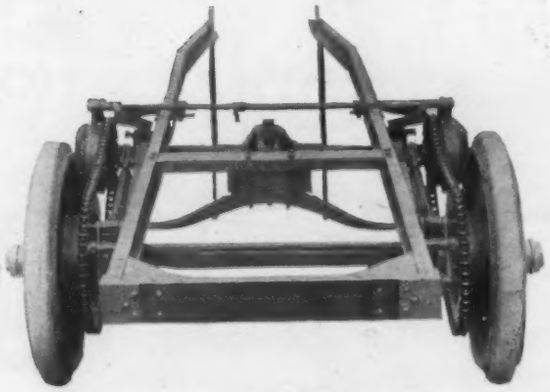
Guaranty, Model V, 6000 lb. Unit for Any Car, $800.
Guaranty Motors Co., Cambridge, Mass.



Guaranty, Model A, 4000 lb. Unit for Any Car, $540.
Guaranty Motors Co., Cambridge, Mass.

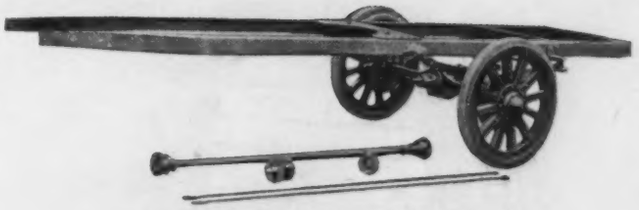


Iowa Truck Unit for Ford Cars.
Iowa Motor Truck Co., Ottumwa, Iowa.



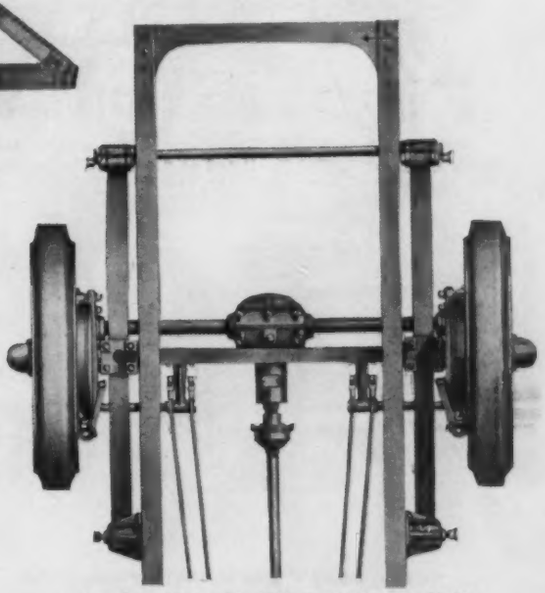
Hoosier, 3000 lb. Truck Unit, $325.
This is a Ford unit but can be furnished with special frame for any car. Sheet Metal Specialty Co., Goshen, Ind.

Iowa Universal Truck Unit.
Made in two models, Model E, 3000 lb., $540, and Model O, 5000 lb., $625. Iowa Motor Truck Co., Ottumwa, Iowa.

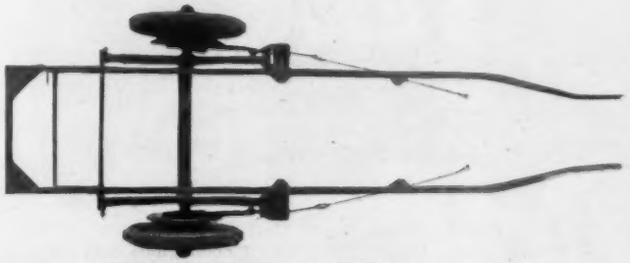


Lauton, Model 22, 4000 lb. Ford Unit.
Also Model 12, 2000 lb. capacity. Lauton Truck Co., Youngstown, Ohio.

Landover 3000 lb. Unit for All Cars.
Landover Auto Truck Co., Marinette, Wis.



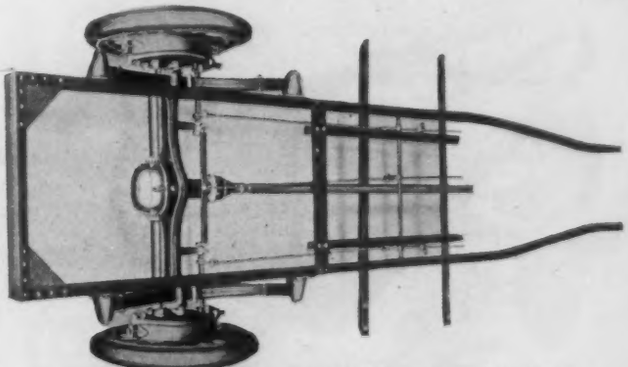
Lauton, Model 31, 2000 lb. Universal Unit.
Also Model 40, 4000 lb. capacity. Lauton Truck Co., Youngstown, Ohio.



Little Giant Convert-A-Car, 2000 lb. Unit, $350.
For all makes of chassis. Chicago Pneumatic Tool Co., 509 Fisher Bldg., Chicago, Ill.

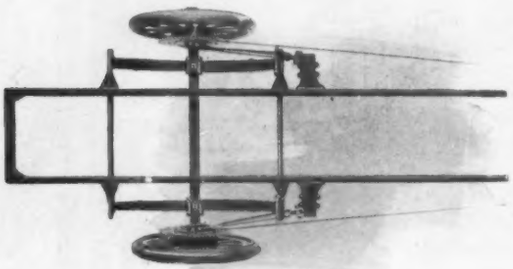
Lucke-Douglas 2000 lb. Truck Unit for Fords.
Lucke-Douglas Mfg. Co., 26 Wilder St., Minneapolis, Minn.

Mars, Model B, 2000 lb. Ford Unit.
Mars Mfg. Co., 3940 Brooklyn Ave., Seattle, Wash.

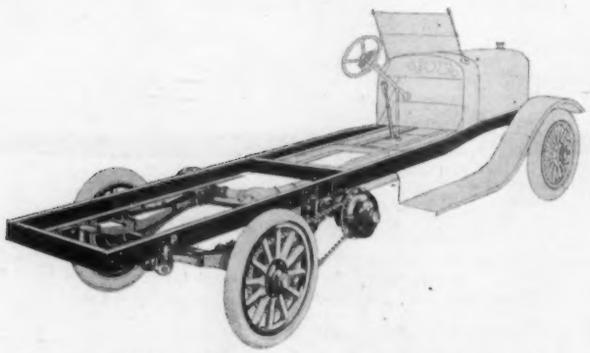


New Comer, Model O, 3000 lb. Unit for Fords, $450.
Also Model A for Ford or any car at $525, and Model C, for any car at $800. D. A. Newcomer Co., 1125 Sante Fe Ave., Los Angeles, Cal.

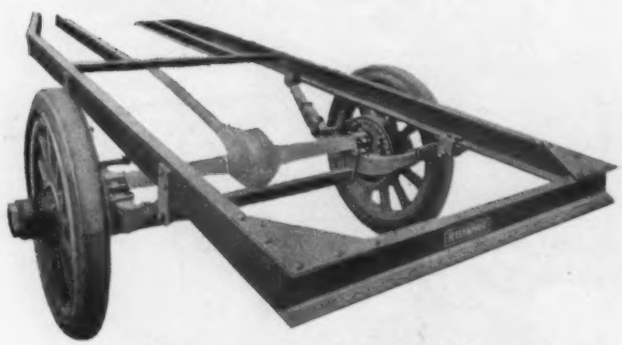
Reliance, Model R200, 5000 lb. Chain Drive Unit, $600.
Also Model R300, 7000 lb., listed at $750, both of which are for all makes of cars. Reliance Trailer & Truck Co., Inc., 30 Eighth St., San Francisco, Cal.



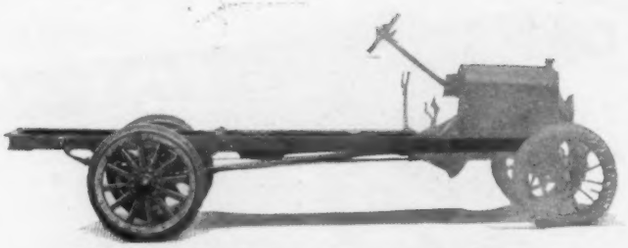
Redden, Model F, 2000 lb. Unit for Fords, $300.
Redden Motor Truck Co., Inc., Harvey, Ill.



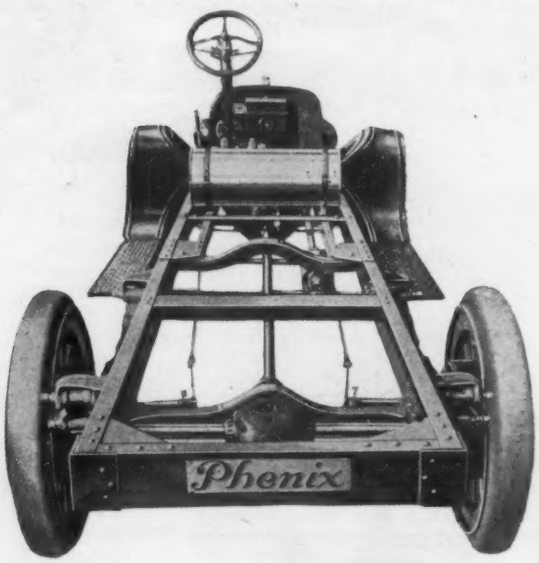
Redden, Model U, 2000 lb. Unit for Any Chassis, $375.
Redden Motor Truck Co., Inc., Harvey, Ill.



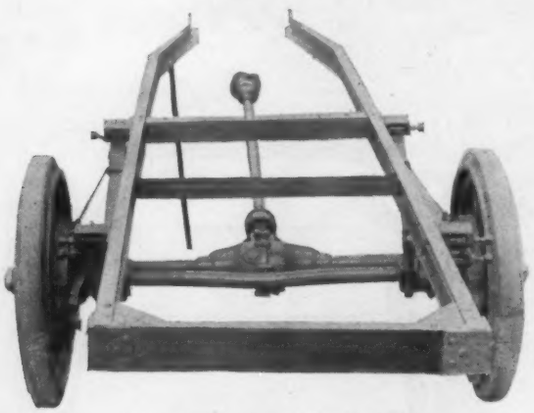
Reliance, Model R100, Internal Fixed-Chain Drive Unit Attached to Ford Car.
These units are made for all makes of cars. Reliance Trailer & Truck Co., Inc., 30 Eighth St., San Francisco, Cal.



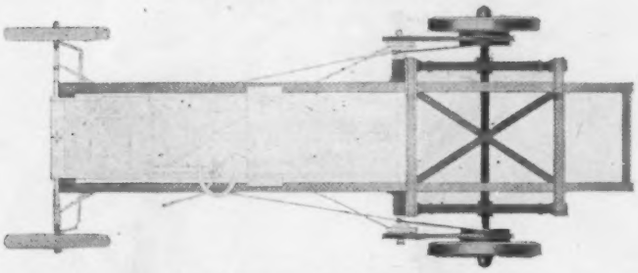
Partford, Model A, 4000 lb. Unit for Fords, $550.
Made in three other models: Model O, 2000 lb., for Fords, $450; Model F, 2000 lb., for any car, $460, and Model B, 4000 lb., for any car, $560. Partlow-Jenkins Motor Car Co., 419 E. Market St., Indianapolis, Ind.



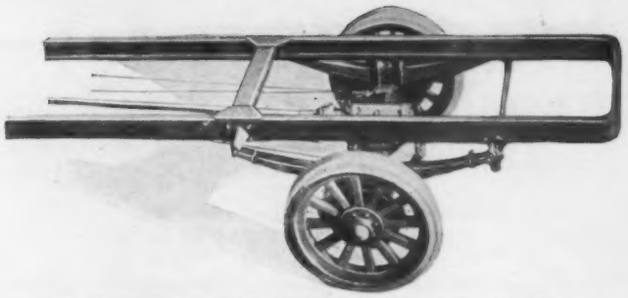
Phenix 4000 lb. Truck Unit for Fords, $575.
Phenix Truck Makers, Inc., 4948 Bloomingdale Rd., Chicago, Ill.



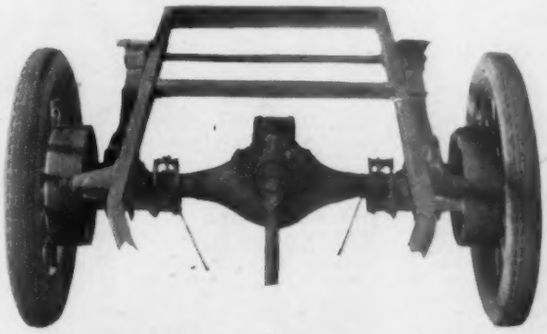
Niles, 2000 lb. Truck Unit, $390.
For Ford or any make car. This unit is made in two other sizes: 4500 lb. capacity, $575, and 6500 lb. capacity, $815. Sheet Metal Specialty Co., Goshen, Ind.



Royal Tonner for Fords, $260.
This firm also makes a Universal Unit for any car which sells for $315. Royal Machine Co., Station B, Cincinnati, Ohio.



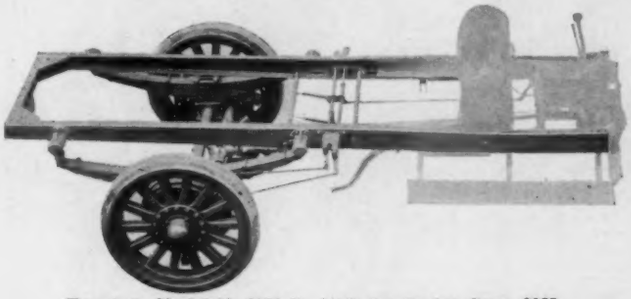
Stevenson, Model D, 4000 lb. Unit for Any Car, $525.
Hedden Place Machine Co., East Orange, N. J.



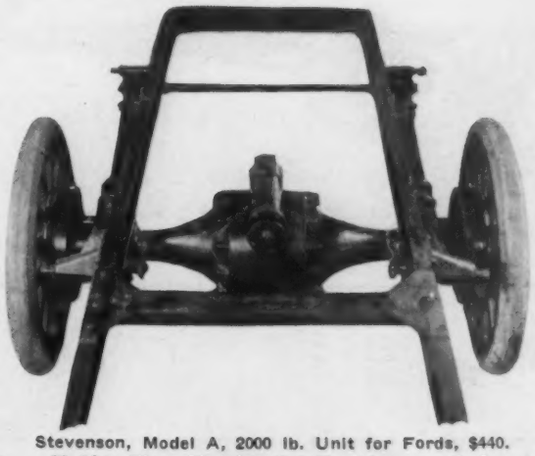
Stevenson, Model B, 1500 lb. Unit for Fords, $400.
Hedden Place Machine Co., East Orange, N. J.

Victor 4000 lb. Worm Drive Truck Unit for Any Car, $625.
Made also in 3000 lb. and 6000 lb. capacities. Victor Truck Co., Inc., St. Joseph, Mich.

Truxtun Unit for Fords.
Made in two models: Model A, 2500 lb., $440, and Model B, 4000 lb., $540. Commercial Car Unit Co., 16th & Glenwood Ave., Philadelphia, Pa.



Truxtun, Model H, 5000 lb. Unit for Dodge Cars, $625.
Commercial Car Unit Co., 16th & Glenwood Ave., Philadelphia, Pa.



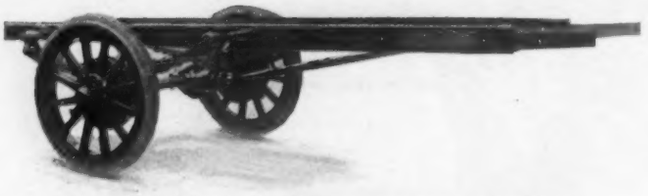
Stevenson, Model A, 2000 lb. Unit for Fords, $440.
Hedden Place Machine Co., East Orange, N. J.

Stevenson, Model C, 4000 lb. Unit for Fords, $500.
Hedden Place Machine Co., East Orange, N. J.

Truckmobile, Model U, 5000 lb. Unit, $550.
This unit is for all makes of chassis. Two Truckmobile models are made for the Ford car: Model B, 3000 lb., $400, and Model Z, 5000 lb., $450. Commercial Truckmobile Co., 1720 Michigan Blvd., Chicago, Ill.

Truxtun, Model E, 6000 lb. Unit for Any Car, $760.
For converting heaviest types of passenger cars into trucks. This firm also makes lighter weight units for all cars. Commercial Car Unit Co., 16th & Glenwood Ave., Philadelphia, Pa.

Victor 4000 lb. Internal Gear Unit for Any Car, $550.
Made also in 2000 lb., 3000 lb. and 6000 lb. capacities. Victor Truck Co., Inc., St. Joseph, Mich.



Truxtun, Model G, 3000 lb. Unit for Dodge Cars, $540.
Commercial Car Unit Co., 16th & Glenwood Ave., Philadelphia, Pa.

Union Chain Drive Unit for Fords, $410.
Union Truck Co., 250 W. 54th St., New York City.

Name of Model	Drive: C—Chain W—Worm, IG —Internal Gear	F—Fords only A—Any Chassis	Capacity	Wheelbase	Gear Ratio	Brakes	Brake Material	Springs	Make of Axle	Tires	Percentage of Load on Rear Wheels	Shipping Weight	Price
All-Car A	IG	A	2500	...	6.5-1	14	.....	49x2½	Russel	34x3½†	90	1150	425
All-Car B	IG	A	4000	...	6.7; 7.2-1	14	.....	49x2½	Russel	34x3½†	90	1275	525
All-Car C	IG	A	6000	...	7.2; 7.7-1	16	.....	49x3	Russel	34x6	90	1450	720
Ameston 20	W	F&A	3000	120	7.2-1	2¼x14	.....	46x2½	Empire	32x4	..	1100	475
Ameston 44	W	F&A	4000	144	7.2-1	2¼x14	.....	46x2½	Empire	32x4	..	1200	485
Blount (Ferguson)	C	F	2000	125	7.5-1	2½x12	Raybestos	44x2	Sheldon	32x3½	..	1000	...
Burman Ford	W	F	3000	125	7-1	2½x15	.....	46x2½	Sheldon	32x4†	90	1200	525
Burman Ford	IG	F	3000	125	7-1	2½x15	.....	46x2½	Torbensen	32x4†	90	1200.	525
Burman Dodge	W	Dodge	3000	130	7-1	2½x15	.....	48x2½	Sheldon	34x4†	90	1350	625
Burman Dodge	IG	Dodge	3000	136	7-1	2½x15	.....	48x2½	Torbensen	34x4†	90	1350	625
Burman Universal	W	A	3000	90	7-1	2½x15	.....	46x2½	Sheldon	32x4†	90	1200	525
Burman Universal	IG	A	5000	170	8-1	2½x18	.....	48x2½	Torbensen	36x6†	90	1600	850
Dearborn Smith	C	F	4000	127	8.5-1	2½x12	Brakebestos	48x3	Cleveland	34x5	90	1400	500
Dearborn Universal	C	A	4000	127	8.5-1	2½x12	Brakebestos	54x3	Cleveland	34x5	90	1500	550
Dearborn Smith	C	F	2000	125	7.5-1	2½x12	Brakebestos	42x2	Cleveland	32x3½	90	1000	400
Dearborn Universal	C	A	2000	125	7.5-1	2½x12	Brakebestos	50x2	Cleveland	32x3½	90	1100	450
Detroit Universal A	IG	F&A	2500	Opt	6.8-1	.....	.....	47x2½	Russel	34x3½†	90	1200	460
Detroit Universal C	IG	A	4000	Opt	7.7-1	.....	.....	47x2½	Russel	34x4†	90	1400	560
Detroit Universal D	IG	A	6000	Opt	7.8-1	.....	.....	47x2½	Russel	34x6†	..	1800	705
E. & W. Ford	W&IG	F&A	2500	128	5 1/3; 6.5-1	2x13⅜	Thermoid	46x2½	Torbensen	32x3½†	90	800	450
E. & W. Universal	IG	A	4000	Opt	7.5-1	.....	.....	46x3	Torbensen	34x4	..	....	550
E. & W. Universal	W	A	4000	Opt	7¾-1	2¼x14	.....	46x3	Standard	34x4†	90	1200	625
Franklin 2-W Conv	C	F	3000	127	7.25-1	.....	.....	2½	Solid	.....	..	1000	...
Guarantee Gee-R	IG	F&A	4000	129	8-1	.....	.....	48x2½	Torbensen	32x4	90	....	...
Guaranty O	IG	A	2500	Opt	6.8; 7.1-1	2½x14	Raybestos	49x2½	Russel	34x3½	80	1200	440
Guaranty A	IG	A	4000	Opt	7.7; 8.2-1	2½x14	Raybestos	49x2½	Russel	34x4	80	1450	540
Guaranty Y	IG	F	2000	Opt	5.3; 6.3-1	2½x14	Raybestos	49x2½	Torbensen	32x3½	80	1100	440
Guaranty U	IG	A	6000	156	7.8; 8.4; 9.4-1	3x16½	Raybestos	49x3	Russel	34x6	80	1700	800
Hoosier	C	F&A	3000	Opt	7-1	3x12	Garco	42x2	Solid	32x3½	90	900	325
Iowa Universal E	IG	A	3000	130	7.8-1	2	Raybestos	54x2½	Russel	32x4†	80	1200	540
Iowa Universal O	IG	A	5000	130	8.1-1	2½	Raybestos	54x3	Russel	34x4†	80	1400	625
Landover	C	A	3000	130	7-1	.....	.....	46½x2½	Solid	32x3½	90	1125	...
Lauton 31	IG	A	2000	145	....	3x14	Raybestos	46x2¼	Torbensen	32x4	..	....	...
Lauton 40	IG	A	4000	145	....	3x15	Raybestos	48x2½	Torbensen	34x5	..	....	...
Lauton 12	IG	F	2000	127	....	3x14	Raybestos	46x2¼	Torbensen	32x3½	..	....	...
Lauton 22	IG	F	4000	127	....	3x15	Raybestos	46x2¼	Torbensen	32x4	..	....	...
Little Giant	C	F	2000	125	6.2-1	2½x12	Raybestos	42x2¼	Own	34x3½	95	1100	350
Lucke-Douglas	C	F	2000	127	2-1	21	.....	44x2	Solid	32x3½	90	....	...
Luverne BX	IG	A	3000	138	8-1	2¼x16	Raybestos	42x2½	Torbensen	32x3½	85	950	450
Luverne AI	IG	A	4000	Opt	8-1	2¼x16	Raybestos	42x2½	Torbensen	34x5	85	1150	550
Luverne A	IG	A	5000	Opt	8-1	2¼x16	Raybestos	42x2½	Torbensen	34x5	85	1225	575
Mars B	IG	F	2240	130	....	2x13½	.....	40x2½	Torbensen	32x3½	..	....	...
New Comer O	IG	F	3000	124	5-1	2x14	Thermoid	50x2½	Torbensen	32x3½	85	960	450
New Comer A	IG	F&A	4000	Opt	7-1	2½x15	Thermoid	50x2½	Torbensen	36x5	85	1100	525
New Comer C	IG	A	6000	Opt	7-1	2½x18	Thermoid	50x2½	Torbensen	36x6	85	1400	800
Niles	IG	F&A	3000	Opt	6-1	2x12	.....	42x2¼	Celfor	32x3½	90	1100	390
Niles	IG	A	4500	Opt	6; 7-1	2½x14	.....	42x2¼	Celfor	34x5	90	1600	575
Niles	IG	A	6500	Opt	8; 9-1	3x14	.....	42x3	Celfor	36x6	90	2200	815
Partford O	IG	F	2000	Opt	5 1/3; 6.5-1	15	Asbestos	46x2½	Torbensen	32x3½	90	900	450
Partford A	IG	F	4000	Opt	7; 8-1	15	Asbestos	46x2¾	Torbensen	34x4	90	1100	550
Partford F	IG	A	2000	Opt	5 1/3; 6.5-1	15	Asbestos	46x2½	Torbensen	32x3½	90	900	460
Partford B	IG	A	4000	Opt	7; 8-1	15	Asbestos	46x2½	Torbensen	34x4	90	1100	560
Phenix	C	F	3000	130	7; 9-1	3x12	Raybestos	44x2½	Standard	32x3½†	85	960	350
Phenix	IG	F	2500	130	7-1	2x13½	Raybestos	44x2½	Torbensen	32x3½†	85	1005	450
Phenix	IG	A	2500	140	7-1	2x13½	Raybestos	44x2½	Torbensen	32x3½†	85	1005	475
Phenix	IG	F	4000	130	8-1	2½x15	Raybestos	50x3	Torbensen	34x5†	85	1450	575
Phenix	IG	A	4000	140	8-1	2½x15	Raybestos	50x3	Torbensen	34x5†	85	1450	575
Phenix	W	F	4000	130	8-1	2¼x14	Raybestos	50x3	Standard	34x5†	85	1500	635
Phenix	W	A	4000	140	8-1	2¼x14	Raybestos	50x3	Standard	34x5†	85	1500	635
Pratt-Williams	IG	A	4000	...	....	2x14	.....	48x2	Celfor	32x3½	..	....	625
Ralston	C	A	4000	128	Opt	.....	.....	43x2	Solid	34x5	90	1100	475
Ray-All-Car	C	A	4000	...	7-1	.....	Asbestos	46x2½	Liggett	34x5	75	1200	425
Ray-All-Car	W	A	4000	...	7-1	.....	Asbestos	46x2¼	Standard	34x5	75	1500	520
Ray-All-Car	IG	A	4000	....	7-1	.....	Asbestos	46x2½	Torbensen	34x5	75	1350	465
Redden F	C	F	2000	124	7-1	2½x14	Asbestos	40x2½	Own	34x3½	90	900	300
Redden U	C	A	2000	146	....	2½x14	Asbestos	40x2½	Own	34x3½	80	1100	375
Reliance R100	IG	A	3000	132	7-1	2½x12	Asbestos	42x3	Own	32x3½	85	900	410
Reliance R200	C	A	5000	144	7-1	2½x13½	Asbestos	44x3	Own	34x5	85	1500	600
Reliance R300	C	A	7000	144	8-1	3x15	Asbestos	48x3	Own	36x6	90	2100	750
Royal Tonner	C	F	3000	130	7.5-1	3x13	Raybestos	50x2½	Own	32x3½	85	950	260
Royal Universal	C	A	3000	148	7-1	3x13	Raybestos	50x3	Own	32x4	70	1050	315
Stevenson B	W	F	1500	119	6.2-1	3x14	Asbestos	42x2½	Sheldon	33x4*	75	750	400
Stevenson A	W	F	2000	125	7.2-1	2½x13½	Asbestos	50x2½	Empire	32x3½	90	1100	440
Stevenson C	W	F	4000	125	7.75-1	2½x12	Asbestos	50x2½	Standard	32x4	90	1200	500
Stevenson D	W	A	4000	135	7.75-1	2½x12	Asbestos	50x2½	Standard	32x4	90	1250	525
Truckmobile B	C	F	3000	133	....	2½x12	Stanwell	44¾x2	Own	32x3½	93	1075	400
Truckmobile Z	C	F	5000	133	....	2½x12	Stanwell	44¾x2	Own	34x5	93	1500	450
Truckmobile U	C	A	5000	166	....	2½x12	Stanwell	44¾x2	Own	34x5	93	1600	550
Truxtun A	IG	F	2500	Opt	6.8-1	2½x14	Thermoid	52x3	Russel	34x3½	90	1150	440
Truxtun B	IG	F	4000	Opt	7.4-1	3x16½	Thermoid	52x3	Russel	34x4	90	1475	540
Truxtun C	IG	A	2500	Opt	6.8-1	2½x14	Thermoid	52x3	Russel	34x3½	90	1200	425
Truxtun D	IG	A	4000	Opt	7.4-1	3x16½	Thermoid	52x3	Russel	34x4	90	1500	540
Truxtun G	IG	Dodge	3000	136	6.8-1	2½x14	Thermoid	52x3	Russel	34x4	90	1200	540
Truxtun H	IG	Dodge	5000	148	7.4-1	3x16½	Thermoid	52x3	Russel	34x5	90	1525	625
Truxtun E	IG	A	6000	Opt	8.4-1	3x18	Thermoid	52x3	Russel	35x5	90	1900	760
Union	C	F	3000	150	11-1	.....	Asbestos	.....	Own	.....	..	....	410
Victor	IG	A	4000	Opt	7-1	2½	.....	46x2½	Celfor	34x4	..	....	550
Victor	W	A	4000	Opt	7.75-1	2½x14	.....	46x2½	Standard	34x4	..	....	625

† Pneumatics optional.
• Pneumatic.

Fleet Building for Furniture Moving

Mobility the Active Principle for Profit Building. Big Body Not Universally the Key to Maximum Profits. Long Hauls and Small Loads Introduce Demand for Technical Knowledge of the Business Among Truck Dealers and Salesmen. Learning New Trends Among Western Warehouse Operators

By FRANK REED

HERE is a lively and informing contrast for you. Do you believe that the character of the building is determined by the foundation quality, and that the result depends on the method? Anyway, here is some evidence!

A year ago a certain truck dealer had two prospects—both in the household furniture storage warehouse and moving business. Finally he closed one of them. A month later he called me on the telephone. "Frank, come down and see the new job I've got standing out in front of the store." When I arrived I thought he was the proud father of triplets. He took me out and paraded me for a long walk around a big and beautiful furniture van. It was a triumph of the body builder's art. How the varnish glistened! The name of the proud owner could have been read in Denver from Pike's Peak on a clear day. A whole gypsy tribe could have dwelt in luxury under its spacious roof. "Jack," said I, "you certainly have been doing your darndest to turn out a swell job in the body and paint line." And he then began to talk service. He and the salesman on the deal had been doing supervising and detective work for a month at the body shop and the paint shop. "Knew everything that went into it. Find a knot if you can—purest of white lead, and lampblack," and all that sort of rot. He talked so much that I began to feel oversold. I got peeved at the old juggernaut. "Jack," said I, "it's a cinch that with this as a starter you will sure close that other deal with the warehouse out northwest." His happy expression faded for an instant. "No, the dang fule took an old flivver away from one of his estimators and put a patent tail on it, and hauls his customer's stuff at night." Then he looked back on Glorious Jumbo, and once again the sunshine was reflected from his beaming countenance.

* * * * * *

It was some months before I gave much thought again to trucks in the furniture moving business. Finally I took time to call, on the same day, on Jumbo's owner, and the fellow who moved his customers' stuff in the dark of the moon. I found them both active, thoughtful, and capable business men, in charge of a business centering in a well built and operated storage warehouse.

Steel Framing is a Modern Development in Body Building for Large Vans, Which Gives the Very Practical Advantage of Reducing Weight of Non-Paying Load

It is Conceded That the Big Van Body Has Advertising Value

Here you see it developed. The uniformed driver and helpers, white walls of the building, and informative lettering on the white van, are in harmony and convey a very desirable impression

I was agreeably surprised to find that the owner of Jumbo was enthusiastic on the subject of hauling costs. Gasoline mileage, tire mileage, depreciation, interest on investment, and the like were plainly subjects on which he was quite willing to talk—but showed a strange unwillingness to produce any definite figures of his own. Likewise he was interested in the subject of classification of loads. He spoke with some feeling of the fact that the population of a semi-transient character showed a disposition to select homes with built-in sideboards and the like. He indicated how good business was by citing the ability of his firm to "turn down" a good deal of "cheap work." Evidently his study of costs was bearing fruit. Jumbo was as resplendent as ever—washing and polishing apparently were not for a day neg-

lected. And Jumbo was the backbone of his business—his pet piece of rolling stock, and "a fine advertisement for our business on the streets." But there was something forced about his enthusiasm for Jumbo, just the same. And Jumbo was still unmarried—no mate had come to cheer his life of lonely and resplendent dignity. In other words, looking at the proposition from the dealer standpoint again, Jumbo had shown that he was a mighty poor repeating proposition.

In the Land of Sunshine a Tarpaulin, to Protect Against Dust, is Sufficient Covering. There is Sunshine Sometime Everywhere; How Often is the Whole Fleet Busy on Rainy Days?

And I recalled the weary days the salesman and dealer had spent overseeing body shop and paint shop work. Profit equals income less cost of materials plus labor, plus fixed overhead, plus supervision. And a repeat sale means an all-clear commission—no "cost of working up business." Jumbo had me guessing.

A Merchandiser in the Hauling Business

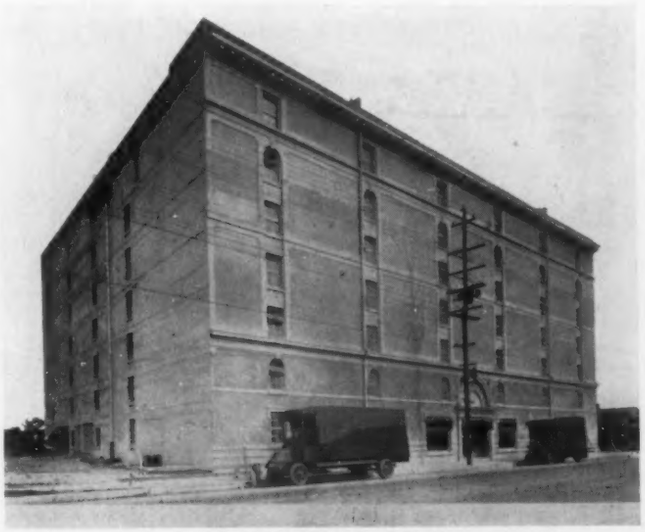
The second man, who had "cheated the dealer out of his profit," evidently thought I was interviewing him as a painful duty. Possibly I did subconsciously reflect the feeling I had absorbed from my friend in the trade, that this operator must at heart be "some sort of a cheap guy." Anyway, he started in to impress me by telling his whole business history. He had been in a merchandising line for some years. He didn't know anything, technically, about trucks, or who were the big men in truck manufacturing. A dense sort of a chap, I figured. But he warmed up and told about some of his ideals. Woolworth had tremendously impressed him. So had Whelan, who built up the business of the United Cigar Stores from a beginning behind the counter in a little hotel stand. And, again, some young fellow who started in as a drug clerk, and soon was the buyer, and in almost a jiffy the financial and operating genius of a tremendous drug store syndicate, expanding his field into all kinds of gimcracks and notions of daily demands. I was about ready to break away in disgust before he had succeeded in conveying to me the new thought that now he considered himself simply a merchandiser in ton-miles, or chair and table-miles, or however you care to express his complicated operating unit, and was feeling his way in the application of the principles of catching all demand, having no waste space, moving fast, and thus adding to the certainty of quick turnover of invested and working capital. Doing this without cutting prices, he felt that he was certain to increase his annual profits on invested capital much faster than a competitor less alert in the application of merchandising principles. So, in purchasing trucks, he sought small units, low first cost, reasonable speed—in other words, a maximum of control and mobility. To him, a truck was just so many moving dollars, going out to capture a profit. He was feeling his way to the lowest annual cost per traveling unit, and would then possibly invest in better equipment, to cut down operating expense and depreciation—but by the time he did this his low cost equipment would have earned its own writing-off, he declared. Whatever mistake he had made in buying too cheap, if any, would have nevertheless paid for itself in fulfilling the larger principle applying to his business as a whole. He solved the problem of idle time of drivers of small units not required on the road by shifting them for an hour or a day into the warehouse, where there was always plenty of work.

This man had made several additions to his fleet since purchasing the unit that cheated Jumbo's proud deviser out of his opportunity to better his record with a still more gorgeous body layout.

Sympathy with the owner of a fleet of "cats and dogs" does not come natural to a truck man, but for once in my life I had to admit that here was a mixed fleet of low grade units with something like a plausible principle behind it—particularly as the owner had in mind definite steps toward better grading and standardizing, for economical operation and maintenance.

Long-Distance Home-Moving on a Permanent Basis

Moving household goods long distances in trucks has received a wonderful impetus in war times. Railway congestion and delay have been factors of importance in throwing this business to the truck operator. But let no man think that the readjustment to peace conditions and ultimate restoration of normal railway capacity for civil business will mean the withdrawal of this business from the motor truck. Railway congestion has been a sound argument on economic and service grounds for getting this business away from the railroads, into the hands of truck operators. It was a convincing talking point, capable of exciting interest and inducing buying action when something exceptionally strong was needed to get the public weaned from age-old habits of using the railroad for any move greater than a normal day's horse haul of twenty miles or so. But the foundation of the business of truck haulage goes so much deeper that, now it is established, it is bound to persist and grow.



Of Course Every Big Storage Warehouse is a Present or Future Truck Prospect.

The ratio of truck to building investment — stationary plant to rolling stock — is far too low with such operators. It is up to truck salesmen to present practical plans to develop their haulage business.

In California good roads, the marvelous concrete state highway system, brought about the development of profitable long hauls of furniture in trucks long before railway congestion and delay became factors in the situation there. This is amply proved by the records and experience of leading operators in that locality. There is a concern in Santa Barbara which found that the purchase of high grade trucks in 1916 nearly doubled its business almost immediately, through enabling it to close deals on the basis of a 24-hour service between receipt and delivery, without excessive packing and crating charges, to points within 150 miles. The concern that can "move you any time, anywhere," is the one which builds up a prestige and good will that swings an amazing amount of local business. A man finds it natural to consider the protection of his goods first, as against a trifling saving in haulage costs, and the mover who can prove perfect delivery on many long hauls does not have to argue much for the efficiency of his methods on local work. Incidentally he is undoubtedly a better prospect for high grade trucks, as these, in themselves are a talking point to his customers, as well as an actual producer of better service in speed and freedom from damage. When one has seen trucks hauling furniture over that wonderful series of switchbacks known as the Ridge Route, between Los Angeles and Bakersfield, 120 miles, of which there are 29 miles of continuous mountain road, winding in hairpin turns and long grades from about sea level to the summit of Liebre Pass, 4360 ft. altitude, and later for 15 miles down the mighty decline of the Tejon to the Great Central Valley; and again, through the sage brush hills and alkali pan sheep barrens between Evanston and Rock Springs, Wyoming; and in scores of rural and desert districts of the Great West, and daily between Philadelphia and New York and even on to Boston, over the macadam and asphalted highways of New Jersey and Connecticut, and countless points between, the "I don't believe it can be done" or "I wonder if it pays" attitude of the skeptic simply marks him as a beginner with a lot to learn. All the facts are in favor of the man who argues for the truck, against the railroad. It is up to the truck salesman to know these facts, and impart this knowledge to the prospective operator.

Cut-Under Loading Space, With Accessible Corner Platform and Elevator for Running Trucks Direct to Upper Floors

Fleet planning properly begun, at the warehouse itself, where idle time runs into operating cost. These desirable features were found at the Hollywood (Cal.) Fireproof Storage Company warehouse, erected after the firm became a truck owner.

As for volume of business, readjustment for war produced it in the past 18 months; and readjustment for peace will keep families moving by the thousands for two years more in highly abnormal volume. Now is the time of times to get in on the increase in a proven business.

Firmly established operators in the west have done some interesting things in feeling their way toward mobility and flexibility of equipment. They have not hesitated to make new starts in forms a long way from the traditional big, heavy, enclosed van.

C. G. Munson, manager of Shattuck & Nimmo, has experimented with a semi-tractor type, shown in a photograph, using a trailer built to carry three tons behind a light automobile front unit. These people operate a warehouse largely devoted to commercial storage. Munson jumped to this outfit from his former standards of 2 to 5-ton units; he wanted to find out things.

His experience with semi-tractor trailers on one run is interesting. This was a daily freight haul between Los Angeles and Long Beach, 65 miles a day, six days a week, full load out, returning empty two days out of the six, and on the other four with ½ to ¾ of a load. He figured the round trips, on pre-war days unit costs, 20c. gas, with two men, gas, oil, insurance, depreciation to amortize $1300 in three years, tires, everything but office overhead, at $8.50 a day; average daily earnings $15. This cheap experimental outfit had a trailer using two axles of an old wagon, built up with roller bearings, built-up wheels, wagon springs, and a built-up fifth wheel. As the tractor was detachable, it was possible to use a 3-trailer unit, one on the road, one loading at each end.

Previously this hauling had been sublet to owners of big trucks, on a percentage basis. They averaged $9.75 a day, were not satisfied, kept changing, and were not as careful as the company's own men; the company had no positive means of controlling them. They had spent money building up this route, and eventually took full control of it to give the public service. The experiments with the low-cost units were the result of these conditions.

A Low-Cost Unit that Has Proven to be Very Handy in Getting Into Awkward Places

Four-speed transmission helps in starting and hill climbing with heavier loads than could otherwise be carried

A factor mitigating against expansion of this kind of a business, the management of this warehouse has discovered, was the tendency of individual owners of trucks located in little towns outside to run in with produce and the like, and cut prices below cost on freight and household moving that would enable them to get back-hauls.

As for real long distance furniture moving, they still pin their faith to the big padded van, that is the established furniture men's standard—"fine up to 100 miles."

But, in the opinion of this operator, rather than trust his goods to an irresponsible truck owner, or lessee, the average home mover would, better still, patronize the railroad. Speed is not to be cultivated, nor confused with elimination of delays. Munson says 12 miles an hour is fast enough with household goods. He advises manufacturers' salesmen, in talking costs, to get data on suitable allowances for "bad luck, bad weather, bad roads, etc." If they would do this, he thinks, less irresponsible competition would arise, and in the long run the business would absorb more trucks, due to those in service being in the hands of people able to push motor hauling, instead of merely scalping spontaneous demand.

The Side Entrance, Copied by This Western Operator From a Design He Saw in Detroit, Renders Backing up to the Curb Unnecessary. The Gang Plank Makes Heavy Pieces go in Faster

Warehouse Built to Benefit by Truck Efficiency

Hollywood Fireproof Storage Co. has made the motor truck a basic feature of its whole plan of doing business. When its was ready to erect its Class A warehouse it determined that all its hauling should be done by motors. It did not permit horse hauling to enter into the calculations to the slightest degree. And the warehouse was designed accordingly. It is significant to people interested in the motor truck industry that up-to-date warehousemen have reached this stage of experience and practical judgment; in fact were at that point, in this particular instance, more than two years ago, and have seen the correctness of their forevision demonstrated on their books in the ensuing period.

Watchfulness Plugs Leaks While They Are Small

Manager David L. Gregg, of the Hollywood Fireproof Storage Co., says that constant watchfulness is necessary in truck operation, as leaks will creep into it more quickly than into any other branch of the business.

The only correct method for arriving at cost of operation in this kind of business is on the basis of extended experience, as the possibility of accidents, etc., exists constantly, and as time goes on experience shows the cash figure which must be set over against this risk, under any given efficiency of management. The figure determined by the average of a year's operation is likely to be considerably different from that which would be estimated on the basis of one month's experience. To get a really useful and dependable figure, an average based on experience of three years' operation, at least, is required. This company segregates all truck investment, and income and expense related to the haulage proposition in separate ledger accounts. The ledger account "Cartage" is the record of anything earned by trucks or vans. "Truck expense" covers all expense, including the familiar items of repairs, tires, gasoline, oil, etc.

"Drivers & Helpers" is the account showing direct operating expense. It is made up from the job tickets which show job number, lot number, men working, and their time.

Operating delays are cut to a minimum at the home end by, first, employing steady, well trained help, uniformed, and taking pride in their jobs and equipment; second, up-to-date warehouse design in such features as loading platform and approach, and a big elevator for taking loaded trucks to any upper floor. A fair period for going out and emptying a five or six-room house and bringing in the goods is 3½ hours, using two men, if there is no piano; if there is a piano a third man runs around in a flivver, helps load it, and then beats it home or around to another gang that has a piano to shove.

Uniform Prices to All on Printed Schedule

Prices for moving furniture are set out on a printed schedule, quoting by the hour according to type of vehicle and number of helpers. Long distance hauls are quoted by named terminal points, in two classes, for large and small loads, respectively.

This company has found that the majority of their work is handled more economically with smaller units. In handling a sudden volume of work in excess of their vehicle capacity, and particularly work requiring big vans, the existence of a spirit of co-operation with other warehousemen and hauling contractors enables the firm to hire trucks and vans for temporary assistance; and this has worked out satisfactorily.

A big advantage of truck operation is ability to work continuously, disregarding set working hours. Mr. Gregg says, "We start at 7 A. M., and the normal day ends at 5 P. M.; but the actual working time may run into the night, or all through the night. We never stop as long as there is work to do. Imagine trying to carry out that policy without trucks!" When not on the truck, helpers always have work to fill out the day in the warehouse, shipping, packing, stowing, etc. The company employs only practical warehousemen, no swampers. The helpers are all taught to drive trucks.

The men's uniforms, two suits per man, are all supplied by the company, which also pays for cleaning them twice a week, and insists on the men having them cleaned on time. This is considered effective and economical advertising.

The freight elevator has proved to be not only an operating economy, but also a business getter. Wholesale grocers, for example, use this warehouse for special overflow storage, though it is seven miles distant from their own warehouses, for the reason that they can drive their big trucks on the elevator and get quick unloading and loading. It seems that truck salesmen have only begun to learn the advantages of a general speeding up policy which is the usual corollary of investment in rapid hauling equipment, and in reality one of the soundest arguments for motor trucks—even more potent than any possible direct economies. Mr. Gregg is entirely convinced that it is not saving in operation, so much as new business expansion, that carries up the profits of the warehouse owning a good-sized fleet of trucks.

Where Does the Profit Come From?

It is a good thing that this business is getting past its one-time period of

dawdling delay, and constructive policies are the rule of the day. Selling trucks to put this particular business, where it has been infested with old fogyism, nicely on the blink, has, very likely, appealed to not a few salesmen with a sense of humor as the fair and just way to break even with the "furniture moving game." It is true enough that many well established warehousemen have been so slow to absorb truck ideas that the salesmen competing for access to their ears and their check books would personally have been cash ahead if they had clubbed together, chipped in, bought the slow one a truck, and gone happily on their way to sell, in the time saved, more trucks to a "live bunch." Anyway, long chances have been taken on time deals with lazy "transfer men," that were "easy sales," although "hard pay." And resultant fly-by-night, irresponsible, ignorant competition has made some warehousemen "sore" at truck salesmen as a class. But all this bristliness is nonsense, and fast coming to be ancient history. So this year is a fine time for both parties to combine their knowledge of basic principles, and hurry the development of big, soundly operated, profitable fleets.

"Keep moving" is the first law of profit. Study the bulks and weights of loads, and work to an average in figuring truck chassis and body capacity. If load consolidation is possible of accomplishment continuously, the whole situation is so different that practice of the big contractors is no model for the man in a district of lower traffic density. Shun excess bulk capacity even as excess weight that "eats" gas and tires. These seem to be some of the principles that progressive warehousemen and truck dealers co-operating with them are working toward. In other words, mobility and flexibility—developing the natural economic advantages of the road vehicle. As one warehouseman who has placed a good bit of business in the truck trade said recently: "About all the experimenting that is necessary has been done. Now it's a good time to get busy and build up the fleets. The business is here, and it is high time we warehousemen asserted our claim to it."

Profitable Farm Hauling With Motor Trucks—Goodyear Tire Co. This booklet discusses the many ways in which motor trucks may fit into farming activities and illustrates the progress Goodyear has made in the big pneumatic cord truck tire field in the last few years. It cites many examples of farm motor truck transport in diversified service in all sections of the country. There are illustrations and stories of trucks which have proven their worth. Interesting figures, compiled by the U. S. Dept. of Agriculture, show the comparison of wagon costs with motor truck costs. These figures show the motor truck to be in the ascendancy. Copies of this wonderful booklet are given free for the asking. Goodyear Tire Co., Akron, Ohio.

Trucks Save Time and Money for R. F. Conwell Company

Handling the material for a large paving contract in the Middle West, the R. F. Conwell Co., contractors, of Chicago, found that a battery of eleven Mack trucks of 7½-tons capacity, proved so superior to horses that they have disposed of 95 equines owned for teaming purposes. The Conwell company secured the contract for laying a six-mile asphalt pavement in the Edison park district, of Evanston, Ill. The work was commenced in May, 1918, and was completed in November of the same year. The amount of the contract was $266,000. The surface paved was approximately 80,000 sq. yds. About forty men were required to handle the trucks, grade, lay the concrete base, and finally, the asphalt surfacing. The necessity for prompt delivery of the material from the railroad yards to the scene of the pavement forced the operation of the trucks at high speed, and at the maximum of tonnage per day. The average haul of material ranged all the way from two to six miles. So heavy was the strain upon the machines that the company expected to abandon them at the completion of the contracts. When the job was completed, the trucks were inspected. To the great surprise of the company, it was found that, with repairs estimated at $500 for the entire battery, the machines would be practically as good as new by spring. As a result, all were placed in the shops for overhauling, and will be ready for 1919 contracts.

The firm reports that had horses been utilized, the contract could not have been completed on time. Each truck handled the tonnage that would have been hauled by four teams, and the work was done in one-third the time consumed by horses

Besides these important factors, the usual congestion of traffic when a large number of slow-moving vehicles are employed in handling such large contracts, always a serious factor in a metropolitan city, was avoided. The Conwell company will have no further need for horses. Trucks will be used in the future. They have earned a permanent home in the operating department of the R. F. Conwell Company.

Dealer Has School for Truck Drivers

A school for instructing truck drivers has been established by the Dowling Motor Co., at their garage, 224 North Tryon St., Charlotte, N. C.

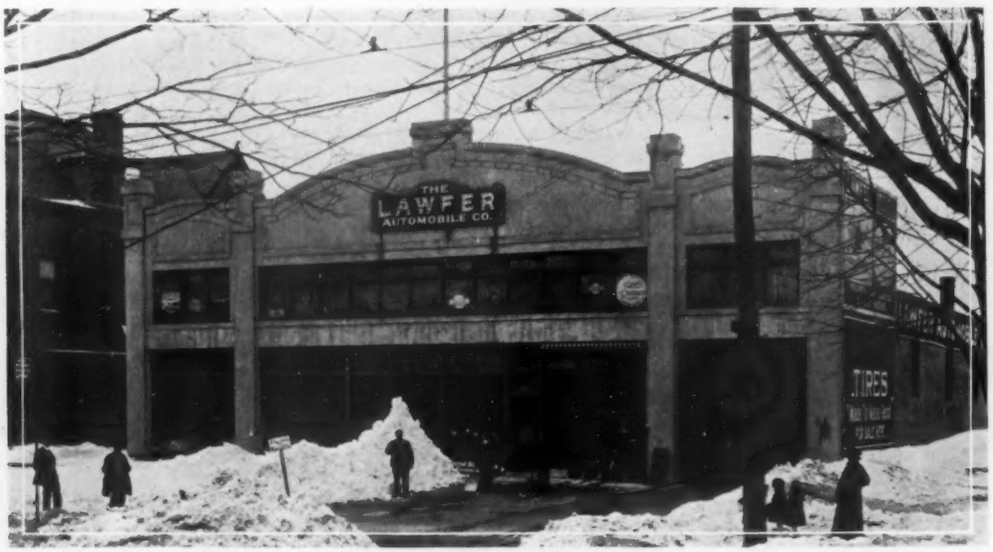
This school of instruction is free to applicants, and it is the purpose of the promoters to thoroughly train the men for careful drivers, and in the mechanical make-up of the machines, so that they will be able to handle minor breaks or give "first aid" before going to the repair shop.

"We do not propose to boost any special make of trucks to the men who apply to us for training," said Mr. Dowling, "but to give these men instructions and training in the general make-up of the machines and impress upon them the duty of taking care of the machines and carefulness in driving."

A Demonstration That Resulted in a Sale

R. G. Remington, truck sales manager for Russell P. Taber, Inc., Hartford, Conn., believes in showing the goods when it comes to a truck demonstration. With a Duplex Four-Wheel-Drive truck Remington found it very simple to negotiate the hills around Hartford, and in search of something hard to do drove into an excavation where a house formerly stood. He has made this sort of demonstration several times with very good results. The stunt always pulls a crowd. When Remington wants to prove how good the car is to a prospect, he gets down into the cellar and then pulls out again. The accompanying illustration shows the car coming up from the cellar over a pile of broken stone at a sharp incline. The cellar was partly filled with snow when the picture was taken. A sale resulted from this demonstration.

Success Invariably Accompanies the Most Active



Learning Lessons in Progress From a Fellow Dealer. Some Methods Being Followed by a Successful Allentown, Pa., Dealer

By W. A. KIRKPATRICK

WHAT is the value of a definite service policy? Do profits on parts and equipment pay? Are incentives for the worker worth while? Should employees be given a voice in the business affairs? How can it be told where and when profits are made? Are there unnoticed leaks eating away profits?

Did you ever sit down and take stock of your methods and the present condition of your business? If you did, the above questions doubtless presented themselves. Then because the way of solution seemed too long and uncertain, they went unanswered and your business remained in the same old rut. You never have gotten up courage enough to board the ship of progress and turn its prow toward the breakers, on the other side of which men say large profits are made.

Right now, as we enter this new era, is the time to build better methods, to use better equipment and to increase your facilities to prepare for every emergency, if you want to avail yourself of the opportunities offered by the growing truck industry.

Very few dealers, in the smaller towns, are prepared for the expansion that looms in the motor truck business. For this reason the work of a progressive dealer in a town of some 65,000 will give suggestive and helpful ideas of what can be done in order to get into the front line of activity.

Eleven years ago the Lawfer Automobile Co., of Allentown, Pa., had a floor space for four cars. Now it can store 146. A steady development and expansion has taught the values of the policies that are now in use, and likewise the importance of keeping both eyes open for new and improved methods. The present building is on the main street of Allentown, a portion of the Lincoln Highway, and is located at the end of the business district, and at the beginning of the residential part of the city.

The building has an attractive front and is 80 x 260 ft. It sets well back from the highway, giving trucks and passenger cars an opportunity to stop in front without blocking traffic. There are two floors on the front and rear, the garage proper being between the two sections. The accompanying floor plans show the lay-out of the departments.

Service a Big Feature in Success

"We are indebted to our service department, to a great extent, for the reputation we enjoy among our patrons," Stanley Lawfer asserts. The same policy is carried out in both motor truck and passenger car fields. When a truck is sold, a letter is sent to the purchaser advising him of the service policy of the company.

This letter inquires if everything about the sale and delivery of the truck was satisfactory. It requests that any criticism of the make of truck, the condition in which it was delivered, and the method of the sale, or any suggestion for the betterment of the service be brought to the attention of the company. The letter encloses a service inspection blank which entitles the purchaser to inspection, free of charge. This blank asks the owner to bring the truck to the garage for a thorough inspection, free of charge, twice a month for the first two months, and once a month for the succeeding five months. The letter further suggests that, for the purpose of eliminating congestion and obtaining better service, appointments be made with the company's service bureau before each inspection.

This inspection blank has a list of some 50 parts of the truck which the service man inspects and checks off. It is said that less than 30 minutes are necessary to complete the work. If the truck is not brought in on the scheduled day, a phone call the following day impresses the importance and value of these free inspections. At the recurring inspection periods brief letters are sent again to remind the owner of inspection time.

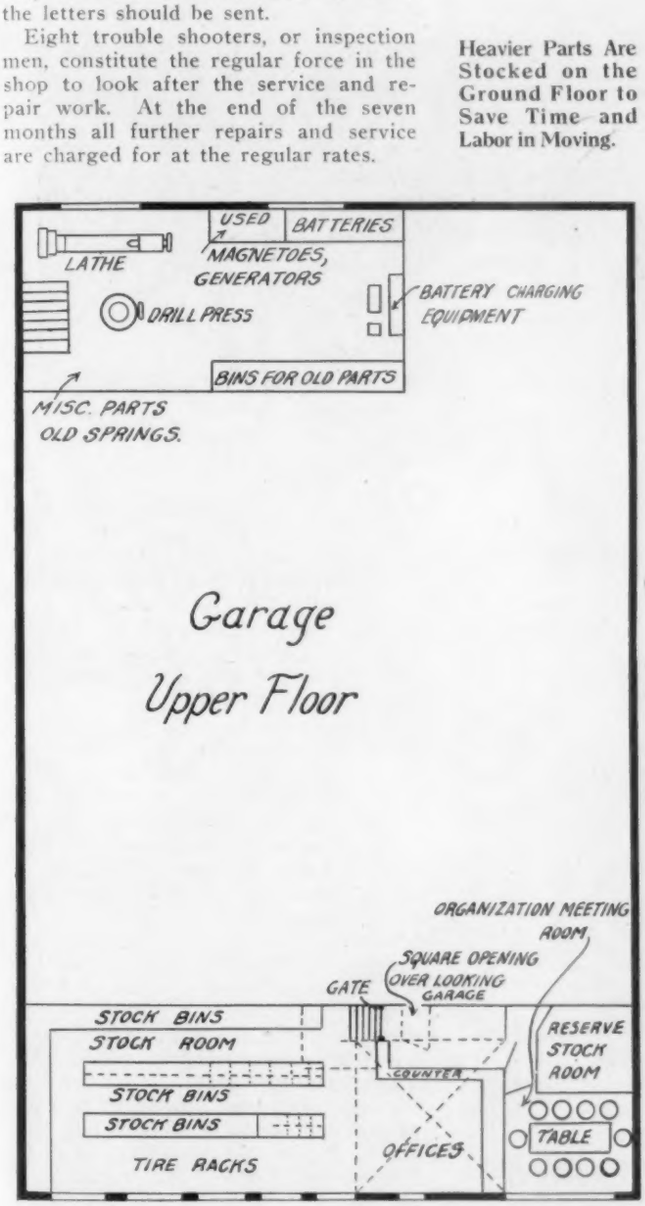
When the seven months' period of free inspection is over, a final letter is sent. This letter states that the motor truck business has grown into one of the largest in the country, and that, in order to hold this position, service must be given. It refers to the fact that the owner had purchased a Loyal truck some eight months previous, and that he believes he has arrived at the conclusion that he has received "service;" in short, that the Lawfer Automobile Co. is really merchandising motor truck service. It mentions the company's aim to keep their business the best conducted one in town. It concludes by thanking the purchaser for his hearty co-operation in bringing the truck for its numerous inspections and for giving the names of prospects.

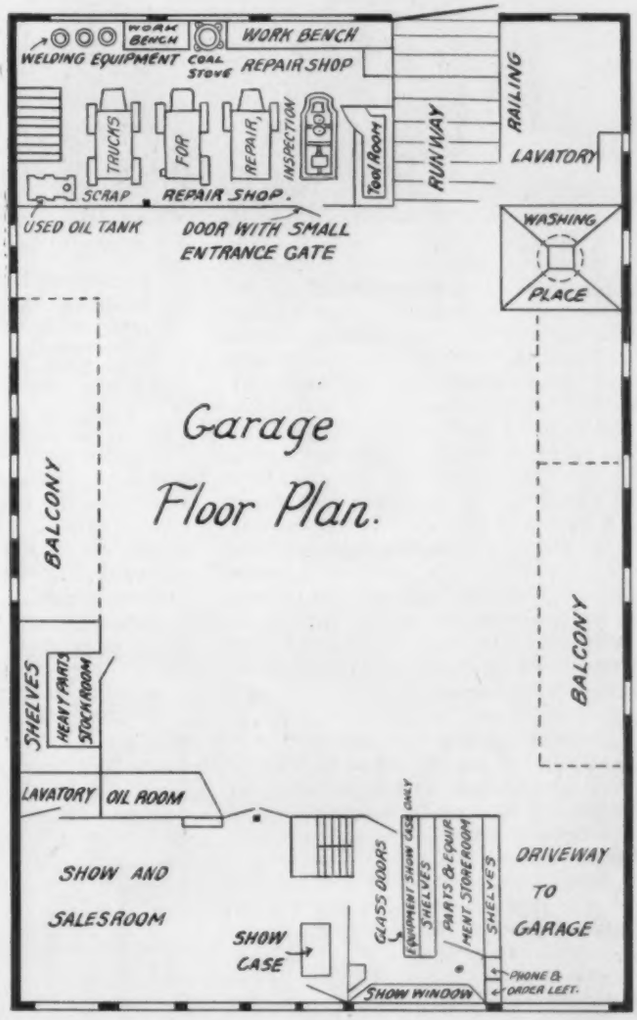
Some dealers will say that such a policy is unwarranted, expensive and unnecessary time and labor lost. The experience of the Lawfer Co. proves otherwise. The decreased number of serious repairs during the free service period—the sale of fresh lubricants, equipments, etc., amply repay the time and expense of following out the service policy outlined.

A card index is kept of each customer as long as he is on the free service list. This card is filed under the date of the next inspection. This method makes it easy to determine when and to whom the letters should be sent.

Eight trouble shooters, or inspection men, constitute the regular force in the shop to look after the service and repair work. At the end of the seven months all further repairs and service are charged for at the regular rates.

Heavier Parts Are Stocked on the Ground Floor to Save Time and Labor in Moving.





The Main Parts and Stock Room is on the Upper Floor.

A card index of each prospect is kept by the sales manager. On the card is the name of the prospect, the car he is interested in, and the time he is to be interviewed. Each morning the salesmen report on their prospects and are given other names by the sales manager. Thirty days is the maximum time allowed a salesman to land a live prospect. If at the end of this time a sale has not been made, the case is turned over to another salesman who is thought to be better adapted to the handling of it. In many cases the sales manager himself takes it in hand. The salesmen are four and seven during the summer. From 8 to in number, during the winter months, 9 o'clock in the morning the reports are made and things adjusted for the day. Usually a day's work lasts from 9 to 5.30.

One of the things that the Lawfer Brothers firmly believe in is incentives to salesmen and shopmen. These take the form of money prizes, extra commissions and a sales record board. Especially during the dull season, or what many dealers consider the dull season, Lawfer makes use of incentives. By encouraging extra effort on the part of its forces and by offering desirable prizes, Lawfer succeeds in keeping his business almost up to normal during this time.

The sales record board, which many firms find an incentive, is also used. The board is ruled lengthwise into a number of equal spaces corresponding to the number of salesmen whose work it is to record. Each space is again ruled lengthwise into equal divisions, one for each make of truck handled and one for used trucks. There are three main crosswise divisions. The upper one covers more than half the board. It is cross ruled into a large number of equal spaces, which are numbered from the bottom up into divisions of 5, 10 or 25, depending on the magnitude of the sales for a month. For every $10, $25, $50, $100 or any set amount of business the salesman brings in, he is credited a point, indicated in column for truck sold, by a colored chalk line.

The Ford truck and the Fordson tractor are handled by the Lawfer Co. The plan which is being followed in selling to the farmer combines the work of two lines with one salesman. A Fordson tractor is loaded on a Ford truck and taken from farm to farm. If the farmer has no need for the truck he may buy the tractor, or vice versa.

Considerable thought and sincere endeavor are put into the selling of accessories. The window to the right of

the entrance is used as a show window and is attractively set up, twice a week, with seasonable accessories. Previous to the time the present arrangements were put in force considerable loss of accessories was experienced through theft on the part of patrons and dishonest employees. To overcome this

Looking Down an Aisle in the Repair Shop.
Notice the order which prevails. There is plenty of light near the workbenches.

condition it was decided to remove temptation. A high board packing protects the display in the show window. The show case in the building is locked. The articles are displayed on shelves, painted white for contrast and cleanliness. Glass doors afford the desired protection. The customer, at the present time, cau see all the different kinds of accessories handled and is not bothered by anyone. If he sees an article that he wants, one of the salesmen gets a duplicate from the accessory storeroom behind the show case. This is a narrow aisle, banked on each side by shelves and bins in which the accessories are stored. A light door at the entrance is kept locked and only authorized persons can enter. The arrangement is shown in the illustration.

Oils and greases are also kept in an enclosure. A display stand and an oil chart stand in the salesroom as an advertisement. These methods of protection against theft and dishonesty obviate the necessity of constant vigilance.

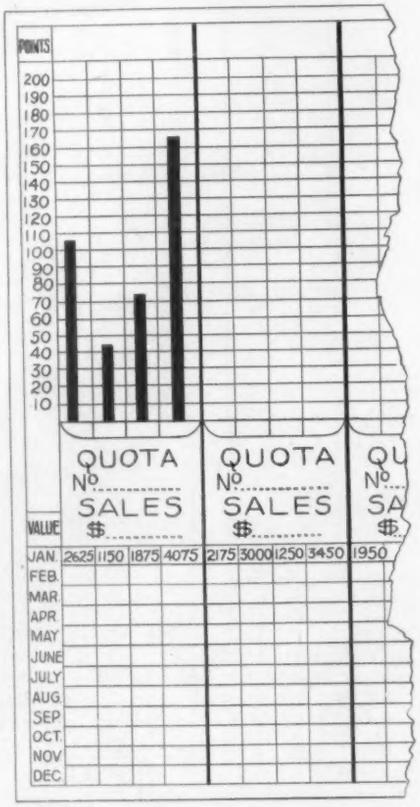
A brief explanation of the arrangement of the different departments of the building may be of interest to others contemplating alterations or enlargements. The two drawings show the layouts of the rooms. In the front, the first ground floor contains the main sales and show room, the small office and accessory room. All the details of the shop work—making out repair slips, charges, etc.—are executed in the small room. In the garage is the enclosed oil and grease room, and the heavy parts stock room. The first mentioned room is used most frequently, and, of course, deserves a place near at hand. The main parts and stock room is on the second floor above the salesroom.

To keep the heavier parts, such as crankcase, camshafts, engine heads, etc., in the upper room, necessitated the expenditure of much time and labor, moving the pieces up and down. To avoid this the heavier parts are stocked in the room on the ground floor. This is just one instance where a slight change eliminated a leak.

A complete stock of parts worth over $33,000 is kept in neat rows of bins, labelled and arranged according to the number of the part in the company's parts list. A stock of tires and tubes is also kept in this room.

Accessories Show Case
Articles can be conveniently examined. The doors are locked against possible loss and the shelves are painted white for contrast.

On a subfloor, between the first and second, is the office. The progressiveness of the Lawfer Co. is again demonstrated in the use of a very complete cost accounting system. The use of this system can be made very simple and inexpensive, and with it every part of the business is run on a profit making basis.



The Sales Record Board Used by the Lawfer Company

The Industrial Congress, at Atlantic City, in December, recommended the adoption of a system of cost accounting by every business firm.

Catch Every Means of Profit

An old oil tank is in one corner of the repair shop where the oil that is drained from the trucks is emptied. From this oil a very neat sum is realized. Above the repair shop, where the lathe and drill are placed, there are a number of bins in which old parts are stored. By keeping these parts where they can be easily reached, they are frequently used in replacement jobs. Magnetos and batteries are used in the same way. During an emergency, when nothing else is available, it is possible to give prompt service by reason of the stock of old parts.

Another illustration of eliminating a leak is the use of a small stove for heating the repair shop when the weather does not justify the firing of the large boiler to supply steam heat to the entire building. This saves many tons of coal a year.

Previously, when a large delivery of trucks came in, valuable garage space had to be given over to storing them. To obviate this a balcony was built on each side where the new trucks are stored. Two planks from a runway and a block and tackle assist in running the trucks up.

The most pronounced feature in the Lawfer agency is its progressiveness. It is not running in a rut. It is not afraid to try new methods. Any improvement is welcome—is sought for. Even when business booms they are not satisfied with present conditions. If by introducing new methods and acquiring new equipment they can improve the business they do it. If a certain way of working will help the men in the shop it is adopted.

W. LeVan Lawfer, senior member of the Lawfer Automobile Co., is only thirty-one years old and his brother Stanley is twenty-seven. The company is capitalized at $185,000. W. LeVan is vice-president of the local trades association and it is probable that the youth and enthusiasm of the two brothers has much to do with the progressive spirit in which they conduct the affairs of the business.

The Unique Work of Trucks in Anthracite Valley

Use of Trucks Saves Large Power Plant One-Half. One Truck Has Seen Six Years' Service

THE big power plant in Plymouth, Pa., that supplies electricity for the entire anthracite valley, with the exception of Wilkes-Barre, has experienced greater saving and service through the use of trucks than formerly through teams. In fact, the advantages are so great that it seems strange that truck dealers have not been able to gain an appreciable foothold in this territory in placing trucks with concerns that haul coal from the collieries. It is an instance where failure to investigate local conditions and to create new fields of usefulness for trucks reacts to the dealers' loss.

The Power-Hoist Dump Body Quickly Relieves the Truck of Its Load When It Reaches the Dump by the Culm Banks

No company will invest in a truck, as a new institution, unless there is convincing proof of its advantages over the methods of hauling, etc., now in use. When the purchase of even one truck is contemplated, many companies go to considerable trouble to obtain figures on cost of maintenance so that a fair estimate can be made beforehand, of the cost of the truck and the profit to be expected from its purchase. How much easier it would be to sell trucks if the dealer were in a position to tell the prospective customer just what the truck will cost him for up-keep, how much work it can do, and what are its advantages over methods of hauling, etc., then in use. This information, as far as possible, should be absolutely accurate and worked out to apply to the customer's particular business. The citation of the successes of several firms engaged in similar lines of work and who have introduced trucks, would be even more valuable than the dealers' figures. All figures quoted should be taken from the records of local firms who are using trucks. The live dealers realize the value of these figures as sales arguments and will keep in touch with such instances. A little investigation of conditions in local fields will often reveal undreamed of possibilities for truck sales.

Develop New Fields for Sales

Almost all of the truck dealers in the anthracite regions of Pennsylvania have little knowledge of the various kinds of work it is possible for their truck to do in that territory, and when they do sense the value of the truck in certain lines of work, there is little inclination to push the sales or exploit the new fields.

Some fear an unsettled market at this time, expecting the Government to dump its war trucks on the open market. They have little faith in the Government's promise not to put its trucks up for sale in the open market. Even if such action should be taken, the truck dealer has little to fear. The government trucks, as a whole, are little suited to use in peace work by private concerns. They are not adapted to the work, they are too expensive to operate, and, unless the government or some private concern would continue to make and stock the parts, the service would soon become very unsatisfactory. It must be remembered that while the war was of first importance, expense was a minor consideration, therefore the Government's trucks were designed primarily for maximum service regardless of cost. Very few private concerns could afford to operate them. The demand for trucks will be met by peace production and the dealer can develop the market for his own line. There are numerous illustrations of local fields that have been hardly touched by coal dealers.

Trucks More Useful Than Teams in Coal Hauling

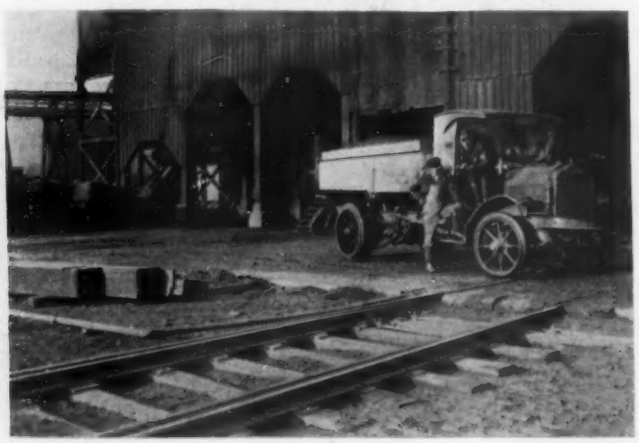
Many plants, throughout the coal regions in Pennsylvania, are using teams to haul coal from the collieries to the power house. Trucks should be used in this work. Their success has already been demonstrated by the power plant mentioned in the opening paragraph. In the winter this company hauls its coal from the colliery to the plant, a distance of two miles. Until recently this work was done entirely by teams, capable of pulling but two tons, at a cost of $1 per ton. One team could make but four trips during the day, hauling in all, 8 tons of coal. The power plant requires 200 tons daily, thus necessitating the use of 25 teams to keep it going full blast.

Since the trucks have been put to work, the cost of hauling the coal has been cut to $.50 per ton. Frank Martz, a truck dealer in Plymouth, hires a number of trucks for this purpose and is making a satisfactory profit. How much more the company to whom the trucks are hired could make if it owned and operated its own machines!

The 5-ton White truck is hired on contract at $25 per day to deliver 40 tons of coal to the plant. It also hauls 100 tons of ashes from the plant to a

Even in Water up to the Hub and on Soft River Bottom the Truck Works Successfully
Loading a White truck with bird's-eye coal from bed of Susquehanna River, at Plymouth, Pa.

dump, three-quarters of a mile distant. The saving in this one instance is more than half. With teams the cost of hauling the coal would be $40 and no ashes would be taken away. The truck replaces the extra teams used for this purpose, and takes 5 tons of ashes to the dump on its way to the coal breaker and so eliminates much lost tonnage. The truck referred to has been in service six years.

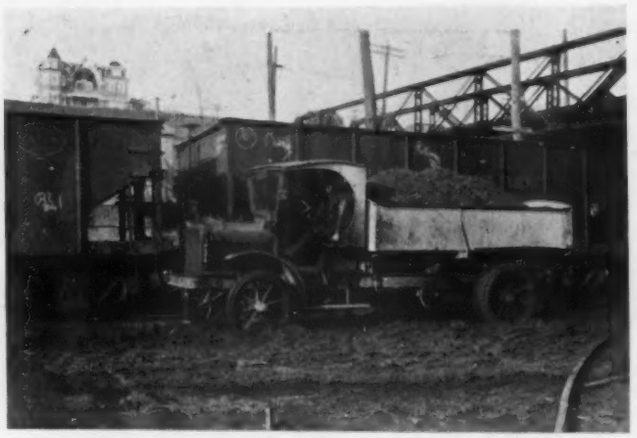


Just After Getting a Load of Coal Under the Breaker.

Chutes Make Loading Easy

With trucks, loading and unloading are very simple operations. At the colliery the truck backs in under one of the coal car chutes of the breaker, a lever is moved, and in a minute the truck has a full load of freshly mined coal. In the breakers the coal from the mine is broken up into different sizes. The small coal cars from the interior of the mine are carried to the top of a huge wooden structure where the coal, ranging in size from a cubic foot in volume to the finest dust, is thrown into crusher rollers. From here it goes through a series of roller sieves so that the coal is separated into various grades according to size, and delivered to the proper compartment. From these compartments it is dumped into the freight cars, trucks or teams through chutes. The trucks are loaded from the train car chutes because the chutes used for wagons are too low to permit the truck to back under them.

The trucks are equipped with self hoisting dump bodies so that the driver need only operate a few levers and a clutch to raise the body and dump the coal. In loading the ashes the same convenient features are used. The power plant built a special ash tank about 30 ft. above the ground with a capacity of almost 100 tons. This tank was originally built for loading freight cars but during the last winter no freight cars were to be obtained so the trucks had to do the work. It has proven so efficient that it is doubtful if freight cars will ever again be used to do this work. All the truck does is run in under the ash tank, the driver opens up the tube, and the ashes drop down into the truck body in volume. The truck goes to the dump where it deposits its load, then goes to the colliery and returns with a load of coal.



On the Way to the Dump With a Load of Ashes

The road is little more than a rut-filled trail, and there are, in this region, 23 per cent grades which the truck must climb.

Different Conditions in Summer

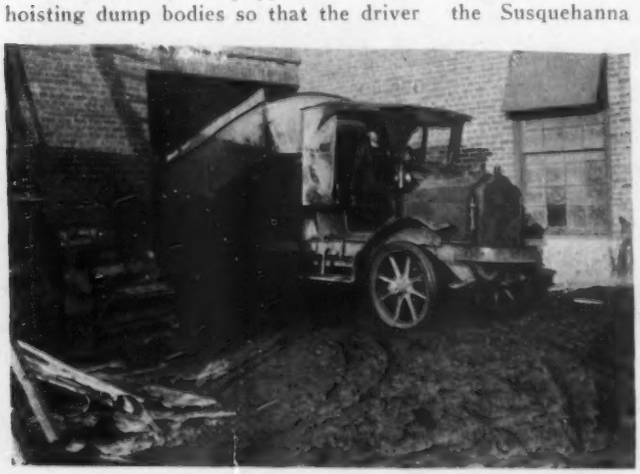
During the summer the power plant secures most of its coal from the river bottom. The earth and coal mixture in the Susquehanna River is taken out, washed on screens and burned as coal. It is a poor grade of dust-like coal but it burns satisfactorily in the endless moving grates of the stoker boilers where a blast of air is constantly playing on it. When teams were used to obtain this coal it was necessary to have three at work hauling the coal from the barges in the river up to the bank where it was dumped. Here it was reloaded into other teams for transportation into the plant. The three teams engaged in the work were necessary to keep the diggers busy all the time, for the coal had to be moved promptly. From the river bank other teams hauled the coal to the power plant, a distance of 4 miles, at a cost of $1 per ton. At the same time three other teams were kept busy hauling the ashes to the dump as mentioned before.

Since the trucks have been doing this work, they are loaded at the barge and carry the coal directly to the plant, making a quicker delivery and saving the extra handling on the bank. The cost is $.75 per ton. Four trucks have entirely displaced the 12 to 16 teams formerly used, and at a saving of hundreds of dollars per month. Although the roads are very poor the truck is able to cover them very successfully and has experienced no trouble so far.

On the river bank where the slimy clay and ooze make traction particularly difficult, a Cleveland tractor is used to help the truck up the grade. Often, when the river is high, the trucks must operate in water up to the frame to reach the boats. One of the illustrations shows this.

During the summer, the three 5-ton and one 2½-tonner are kept constantly busy hauling coal and ashes to and from the big plant. The installation of three larger stokers will mean, in all probability, an increase in the number of trucks engaged in this work, the larger stokers burning as much as 72 tons of coal a day.

Throughout the entire anthracite region there are numerous instances where trucks can be used to effectively replace the teams now used. Much business can be developed by getting in touch with the manufacturer and showing him just how much the truck will save him.



Burning the Coal in Front of the Stokers Just Inside the Building

The truck gets a load of ashes and carries them to the dump on its way back to the coal breaker.

Northwestern Road Building is Being Accelerated by Motor Trucks

Leading Contractors, County Officials and Owners Agree That Trucks Have Greatly Accelerated Road Construction Among the Mountain Passes in the Pacific Northwest

By WARREN EUGENE CRANE

"WE figure that the motor truck saved us $27,000 during 1918," said C. E. Morford, Chief Deputy County Engineer, of King County, Washington. "While the cost averages sixty cents to haul a cubic yard of sand or gravel a mile with horses, it costs only 25 cents a yard with motor trucks.

"During the past year, we have built twenty miles of concrete road, including ten miles near the eastern shore of Lake Washington, nine miles between Auburn and Enumclaw; one mile at Tolt.

Trucks Save $1300 per Mile Hauling Material

A 5-ton motor truck will carry 3½ yards of material with ease, while a team of horses with a truck can carry only a yard and a half to a load. Figuring the building on a mile basis, we have found that we can save $1300 or $1400 a mile by hauling our stone, sand and gravel with motor trucks as compared with horses. We make all of our computations upon the basis of one and a half tons to a yard.

"In our experience, we have found that two hundred feet a day is an average day's work in road building, although we have been able to build as high as three hundred feet under exceptionally favorable conditions. In order to keep going at maximum efficiency, we believe that it is advisable to use four motor trucks in building concrete roads, so as to have enough material ahead at all times.

"Successful road building is a very delicate operation, and two of the most important things for the contractor to do is first, to put in concrete before the wet weather sets in, and second, to keep as big a supply of material ahead as possible so that the work will not be held up unexpectedly. The motor truck, with its great speed, is able to do the work quickly, and it can haul sand, gravel and stone to strategic places inaccessible to horses. The truck, with its automatic dump is far superior to horses from every standpoint, because it can displace several men who were formerly needed to spread the building material."

Joseph Frank, one of the most successful hauling contractors in the Northwest, has kept a careful account of all of his expenditures for his 5-ton White trucks, with which he has been hauling material to the North Road, between Wayne and Juanita, Washington. He states that his average daily expense for the operation of five-ton White trucks, from June to October, 1918, was as follows:

Gasoline	$3.50
Driver's salary	5.50
Tires	4.00
Insurance	.65
Repairs	3.00
Oil and grease	1.00
Depreciation	1.95
Taxes and licenses	.39
Interest on money	.98
	$20.97

Mr. Frank is a firm believer in the theory that heavier roads should be built, so that eleven-ton trucks can travel upon them without injuring them. It is his belief that the loads carried by trucks will be heavier as time goes on, and that the road that was entirely adequate a few years ago will soon be unable to stand up under the strain of the big trucks employed by the motor freight companies of the present and the near future.

"We figure that it costs us 60 cents to haul a yard of gravel a mile, as compared with $1.65 with horses," said Mr. Frank. "In spite of the fact that the cost of operating trucks has leaped from an average of fifteen dollars a day in 1917, up to twenty dollars a day at the present time, we must realize that the cost of feed for horses has also greatly increased, but the advantage still remains on the side of the motor truck."

Figures .056c per Ton-Mile Hauling Gravel or Sand

"We figure that it costs $22.69 a day to operate a White five-ton truck for road building on an 80-mile day basis," said Robert Hubner, Seattle manager of the White company. "These figures include $5.89 a day (salary, taxes and licenses) for drivers, .04c per mile for gasoline; .006c per mile for oil, .08c per mile for tires, .04c per mile for repairs, .01½c per mile for interest on money invested, and .03c per mile for depreciation. It costs an average of .28c per truck mile, or .056c per ton-mile to haul gravel or sand for the construction of roads.

"We have found that the average five-ton truck will run five miles to a gallon of gasoline, and sixty miles to a gallon of oil. The average number of working days in a year is three hundred, but the road builder has a comparatively short season and he must make the most of every modern device, and use the motor truck, so that he can bring his business to a high degree of efficiency."

O. H. Maust, of Seattle, operates one 3½-ton Garford, one 3-ton Garford, one 2-ton Garford, and one 2-ton Atterbury truck in road building in the Northwest. He received commendation from government officials for his road contract work at Camp Lewis, as well as on the road leading from the cantonment to Tacoma. He states that the operation of his 3½-ton Garford truck in road work during the past year has been averaging around fifteen dollars a day in round figures. He says that he figures 25c. a day for repairs during his first year's operation of a truck; $1.25 a day for his second year, and $2 a day for his third year. His gasoline cost runs $3 a day, oil 50c., tires $1.65, depreciation, taxes and interest on money, $2.50. From careful accounting he found that his 2-ton truck has cost an average of $12 to operate during the past year.

"I believe that the operation cost of trucks will decrease during the next few years so that it will require about ten dollars a day to operate a 3-ton truck, including all fixed and variable expenses. This is due to a prospective drop in labor costs, as well as a decrease in the cost of accessories and maintenance."

Spruce Production Corporation Disposes of Equipment

A 26-page booklet found its limits all too small to list the items, given as to class and kind of equipment for sale by the Spruce Production Corporation. Enormous quantities of costly machinery, motor trucks, steel cable, railway trucks, hydraulic jacks, etc., valued at $10,000,000, are stored at Vancouver Barracks, Washington. Much of this equipment has never been used, as preparations were being made for a long war when supplies were purchased. It will be disposed of at any price that can be obtained.

Clark Equipment Co., Buchanan, Mich., maker of Celfor axles and the Clark disc steel wheel, has prepared a folder for distribution to the trade, containing an appreciation of Lincoln's addresses, together with the speech delivered to a few of his friends on February 11, 1861, when he left Springfield, Ill., preparatory to taking up his duties as President of the United States.

Trucks Are Now Indispensable to Artificial Ice Company

Sixteen Motor Trucks in Constant Use by Bloomington, Ill., Ice Manufacturing Concern

By E. E. PIERSON

NEW policies of the railroads, which discourage short hauls and light loading of cars, is a distinct advantage to truck manufacturers and those who operate them, according to Herman Fifer, president of the Bloomington, Ill., Manufactured Ice Company. Converted to trucks six years ago, the first institution in that city to invest, the number has been steadily increased, until today, sixteen are in constant service, taking care of retail and wholesale trade in artificial ice. Two years ago, when the railroads issued a new ruling that twelve tons was the minimum shipment of ice that would be accepted, the Bloomington firm began to receive orders from rural towns, up to twenty-five miles distant, and it became necessary to increase the number and size of the equipment to take care of the suburban business newly created.

Two of the Autocars in the Service of the Bloomington Manufactured Ice Company
Sixteen trucks have displaced forty horses, with the result that the saving in delivery expense is from thirty to thirty-five per cent

Increased Business Through Use of Trucks

A charge of a dollar per hour was made for the time consumed in making a trip to rural districts in addition to the regular price of the product handled. In addition to vastly increasing the business handled by truck, the company also has been supplying many rural firms which have recently invested in trucks of their own and which they use to bring poultry and other farm products to the city and then return with ice. This has developed an unexpected angle affecting the ice business. Prior to the advent of the trucks and the restrictive order of the railroads, it was the custom of the concerns, using a large quantity of ice, to cut their supply each winter from some adjacent pond, and store it in their own house. Now, with the advent of the truck, such firms, in many instances, have abandoned the former method and purchase their ice as they need it, this being regulated by the condition of the weather, quantity of business, etc.

The change has been found to be much more satisfactory, avoiding the work and annoyance of storing the product, and also promoting economy. In addition, there has been objection to the use of ice from rural ponds and lakes, due to the presence of impurities and disease germs. This is avoided by the use of the distilled water product, frozen artificially. The Bloomington company is looking forward to a very heavy business during the coming year, from the suburban towns of central Illinois and is planning to handle it, taking advantage of the changed conditions, brought about by the railroads and rapid increase in the number of trucks. The ability of the rural consumer to time his movement to the city to replenish his supply, so as to avoid waste and secure the exact amount his business requires, is an important consideration and redounds to the advantage of both patron and manufacturer.

The Bloomington company operates Fords and Autocars. Four are the two-ton capacity and are operated by two men, taking care of the wholesale trade. Eight are the ton-and-a-half capacity, and four handle 1200 lb. The sixteen trucks have displaced forty horses. Each truck below the two-ton is operated by one man who drives and also makes delivery of the ice. The saving in expense of delivery, as compared to horses, is 30 to 35 per cent. This applies only to the financial saving. The advantage in dissipation of worry is 100 per cent.

When horses were used the delivery was unsatisfactory, especially in torrid periods, when the demands for ice assumed tremendous proportions and when the horses could not be speeded up. Now, the company can take care of almost any demand, and there is no limit, apparently, to what the trucks can do in taking care of the urban trade, running night and day without any appreciable impairment. The wholesale delivery trucks handle 20 to 25 tons per day. The retail, taking care of the family trade, average six tons per day.

Trouble anticipated from reckless or inexperienced drivers, has been negligible, according to the experience of President Fifer. He states that the motors in most of the trucks now on the market are "fool proof" and that the principal point to be guarded is lubrication. He watches this feature closely and finds that when oil is not spared, trouble reaches the minimum point.

It is required that speed be kept down to a reasonable point, 16 miles per hour for the larger trucks and 12 miles for the smaller. He finds that there is more danger in being hit by the rapid moving taxis or passenger cars, than in striking pedestrians or vehicles. The percentage of accidents in the six years that trucks have been used has been remarkably small, while none have been of a serious character.

While it is admitted by President Fifer that there is a great percentage of depreciation in the value of motor trucks, there is just as much depreciation in horses. When forty of the equines were maintained, there was a certain number of deaths each year and this, with the wearing out of the animals, balanced in depreciation that of the motor trucks.

Summing up, President Fifer believes that the arguments in favor of the trucks for the ice business are so overwhelming that it would be ridiculous for any firm to hesitate. A return to the old conditions, he says, would not be considered under any circumstances.

Hiring Trucks on a Brokerage Plan in Connection With a Company-Owned Fleet

With Words of Warning on the "Hoboes of the Highways" and Overconfidence With Undercapitalization in Intercity Hauling

By K. HERRICK

CERTAIN features of the business of the U. S. Auto Shipping Co., of 133 Arch Street, Philadelphia, and 140 West Eighteenth Street, New York, are worthy of study by anyone who may be considering entry into a similar line of operation. This concern, whose general manager is M. H. Garrison, a traffic expert of long standing, does local and long distance hauling by the day, hour, or contract, maintaining a daily service to and from New York and other points. At least ten motor trucks are in constant use and it has a list of forty which it uses on a brokerage basis.

This brokerage end of the business is one of the most interesting phases of its management and in that it is different from most of the larger intercity hauling companies in Philadelphia. The company's list of forty individual truck owners, whose cars it uses to supplement its own fleet, is made up of only thoroughly responsible persons. The company keeps tab on when and where to call for these cars and it is not bound by contract to keep any or all of them in work, but uses a car, or rather supplies it with work, according to the company's needs. Both parties appear to profit by the system. The individual owner is saved the trouble and expense of hunting for a shipper and the company is immediately provided with extra cars on demand.

The company collects all bills for the work done by the individual truck operators or owners and takes out ten per cent. for its service in obtaining work for them. That this plan is satisfactory is attested by the number of willing operators.

Trucks Have Specially Designed Bodies

The bulk of the intercity trucking of the company is done with 5-ton Peerless cars, with bodies especially designed for the company's use. These bodies are of the high-stake, slat-side type, provided with frames for canopy, so they may be used as virtually tightly-closed vehicles with the aid of heavy tarpaulins, or as open-top cars.

The fleet consists of a Pierce-Arrow 3-ton stake body, a 5-ton, closed body Signet, three 5-ton closed body Halls, a 3-ton closed body Hall, a 1½-ton Reo, a Ford Form-a-Truck of the same capacity, a 3-ton closed body Stegeman, and a 2-ton Autocar used mainly for pick-up work. Two chartered cars also are used for local expressing and the brokerage list, of course, is called on for any additional cars required.

Pick-ups are made directly from the platforms and chutes of customers and the company's main office and warehouse are at the same Philadelphia address, so there is no necessity for a company-owned platform, or a regular schedule of arrivals and departures from the warehouse. In fact, owing to the nature of the business, there cannot be such a schedule.

The trucks leave the platform, or chute, of a customer, as soon as they have been loaded. If they are to make deliveries in New York, or other outside point, off they go without returning to the warehouse of the company. The warehouse is used virtually for the storage of only the smaller articles until shipment is to be made.

Charges Based on Hundredweight

Charges are made at the rate of a dollar a hundred pounds, the entire long distance hauling business being based on hundredweight. No package, however, is too small and no bulk merchandise too large to transport. But there is a minimum charge of $1.

The company's customers are drawn largely from the big tapestry, silk, plush and other textile mills in the outlying sections of Philadelphia and an especially good argument is made to clients, that using the company's motor trucks is a very substantial saving over shipping goods by the railroads. Here are points made by the U. S. Auto Shipping Co. in support of its economy argument.

Based on the hundredweight charge plan, there is a saving to the shipper by using motor trucks as against the use of railroads for transport, of at least 53 cents for every hundred pounds shipped.

The goods shipped by motor truck are handled only once, on the "store door" plan, as against three handlings on the steam roads.

The motor trucking company, with its responsible drivers and helpers, wraps much of the merchandise, such as bolts of cloth, in heavy, coarse paper, there being no further packing required. This eliminates cost, as expense to the shipper also is greatly reduced in the case of other types of merchandise, which are placed in cartons by the trucking company's men, instead of in costly packing boxes, or crates.

The cost of packing boxes of the kind used for railroad transportation averages 50 cents per 100 pounds, net. For instance, a case that will hold 300 pounds of merchandise ordinarily would cost the shipper at least $1.50.

Effective Loading Methods

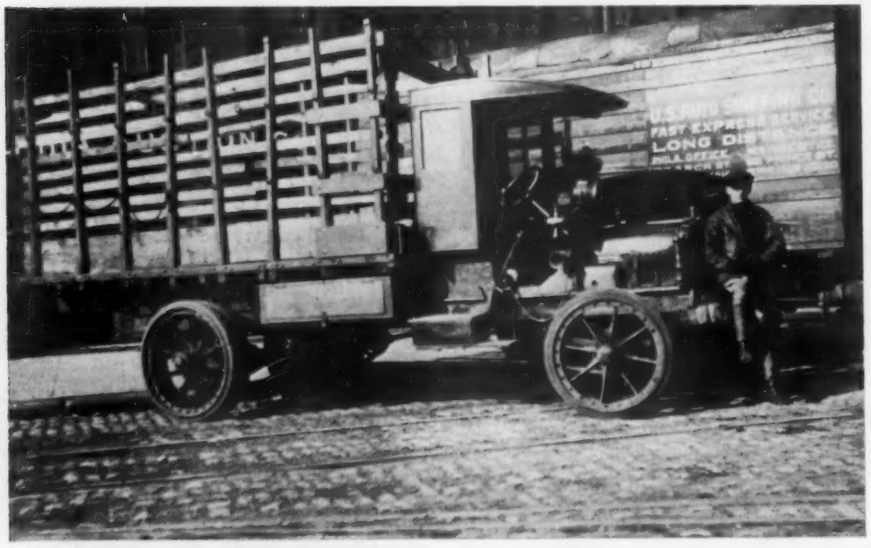
The motor trucking concern's vehicles back up direct to the platform or chute of the shipper, receive the merchandise there, haul direct to door of destination and unload.

Hence, not only is there the saving to the customer in the number of handlings the merchandise undergoes, with consequent wear and tear on goods in transit, but should the customer do all his shipping by motor truck he would

Four-Ton Peerless, Used by U. S. Auto Shipping Company, on New York-Philadelphia Route

be saved the threefold expense of packing boxes or crates, the packers' labor and the space necessary for a packing department.

And this is the proof, in figures, of the saving through the motor truck transportation method on the hundredweight charge plan, over the railroads' method of employing three distinct handlings:



Three and a Half Ton White, Stake Body, High Platform Car, Used by U. S. Auto Shipping Company, for Local Expressing

Cost of Shipment via Railroad

Freight charge per 100 pounds	$.38
Drayage charge, depot to mill	.20
Drayage charge, depot to destination	.20
Cost of packing boxes per 100 pounds	.50
Packers' pay per 100 pounds	.25
Total	$1.53
Total charge by motor freight	1.00
Saving per 100 pounds	.53

For local hauling the company gets $3.50 an hour for a 5-ton truck with only the driver, and $4 an hour with both driver and helper. Therefore, as a dray, or other horse-drawn vehicle can be obtained for $10 for an entire working day, it is cheaper to send a horse-drawn vehicle to a depot, or a pier, this company argues, with reason, whenever it is certain that it will be necessary to wait long in line.

At present the company's Philadelphia end of the business is by far the larger—that is, more shipments are being made out of than into Philadelphia. Eight to ten of the textile mills with which the company does business, ship very expensive materials and almost any one of the company's big intercity trucks carries upward of $20,000 worth of merchandise daily. The goods are insured against theft, fire and collision.

The company, taking both New York and Philadelphia as centers, operates within a 100-mile radius of each. It now has a 3-ton truck making a run to Camden, via the ferry, and to Gloucester and another on the Chester-Wilmington route. Daily deliveries also have just started between Philadelphia, Pottstown and Reading, a three-ton truck service. In the New York zone the U. S. Auto Shipping Co's. trucks connect by special arrangement with the fleet of eight large covered vans conducted by the Benjamin Hirshfield Co., which takes the transferred merchandise from the U. S. Auto Shipping Co. to various points covering the greater part of Connecticut.

Operating costs with this company are based on the trip. The company figures that it actually costs, in round numbers, $20 to send a large truck over the route to New York, not counting the wages of driver and helper.

The time consumed on the run to New York is from eight to ten hours, but on occasions of special necessity, this time has been greatly reduced. Specially-constructed chain drives are used, provided with 23-tooth sprockets and the runs are made over the long distance routes at night, as the company maintains that much time is saved in this way. If a daytime run were made to New York, for instance, the trucks would arrive after the consignee's place of business had been closed for the day and it would be too late to make delivery on the "store-door" plan.

Drivers Selected With Care

In doing a brokerage hauling business in connection with a company-owned fleet, it is necessary to be certain of the character of the owner and driver of every truck so used, otherwise results might be disastrous to both shipper and hauling concern.

Now and then "tramp" trucks blow into Philadelphia, looking for hauling jobs. Some of the owners of these "strays of the highways" are honest while others are not. The honest "hobo" truck may be just easing along from city to city, picking up business when and where it can. If the owner "gets stuck" he often disposes of his car to a "gyp." Sometimes he can get a return load and pays his way back after a long trip, although no stated return load has been in prospect.

Sometimes these "hoboes of the highways" look their name—wild appearing nondescripts, with torn and flapping canopy, or rickety open body, more open, in fact, than the bodymaker ever intended. On the other hand, sometimes they are fine-looking outfits—with a purpose.

A silk shirt manufacturing firm is looking for the prosperous appearing "tramp" truck outfit that obligingly started out with a full 5-ton load of the concern's costly product. The disappearance of the truck and its driver and helper together with the goods nearly broke up the firm—not because of the monetary loss, but because of the subsequent row and counter-accusations of whose fault it was the "tramp" was employed in the emergency. Anyhow, the consignment was a dead loss and the "tramp" evidently had been angling for just such a load. Like the "tramp" cargo vessels, such outfits disappear with their merchandise and rarely, if ever are found. One trick they use is a dummy license tag.

Mr. Garrison, of the U. S. Auto Shipping Co., in speaking of the many motor trucking concerns which have started in business in Philadelphia within the last year and a half, and then forced to the wall suddenly, said:

"Overhead usually has been responsible for such collapses. Many of these concerns started in on too grand a scale. They may have begun modestly, but after seeing how easily, perhaps, they could, under certain circumstances, earn a thousand dollars, they have been overconfident, branched out, fitted up expensive offices and warehouses, added to equipment and so on until the business dropped off. Then they had no reserve and couldn't tide over the waiting period. The individual or concern which buys motor trucks on time—and of course nearly all of them in the trucking business are so purchased—must be prepared to meet, as a usual thing, monthly payments of from $385 to $400 on each truck, in addition to all other expenses and allow for a reserve in times of slack business.

Hebb Stockholders Meet

At the annual stockholders' meeting of the Hebb Motors Co., held February 11th, a regular quarterly dividend of 7 per cent. on preferred stock was declared, and a 10 per cent. dividend on common stock.

The authorized capital of the company has recently been increased from $1,250,000 to $2,500,000, to take care of the increasing business of the company.

Motorized Milk Deliveries Save Money for Boston Dealer

H. P. Hood & Sons Company is Replacing Its Horses With Trucks, Tractors and Trailers, Not Only Because Upkeep is Cheaper But Because Motorized Deliveries Have Proved More Efficient

By SAMUEL SAYWARD

GRADUAL elimination of horse-drawn milk wagons for motor delivery is taking place throughout New England, in both city and rural districts. Of more than a score of big dealers handling the milk supply in and around Boston, not one has, after trying motor delivery, given up a single truck, tractor or trailer, to return to the horse-drawn method. That all milk is not handled by motor truck is largely due to the fact that, during the war period, it was impossible to secure the necessary motor equipment.

Without question the largest milk dealer in both the wholesale and retail fields, is the H. P. Hood & Sons Company, with headquarters for the distribution of milk in Charlestown, just across the Charles River from Boston, which distributes hundreds of thousands of gallons of milk daily in Boston and its suburbs and which maintains thirty-five branches in addition to the Charlestown headquarters.

Trucks Stand up Under Every Condition

Probably no business in which trucks and trailers are used is more exacting, day in and day out, year in and year out, in every kind of weather, than the handling of milk. In extreme cold weather it must be handled without freezing, necessitating, on many occasions, the use of heat in the large and small trucks. In hot weather quantities of ice must be used to preserve it until it is delivered and must preserve it at the most advantageous temperature so that it will not sour as soon as delivered. The use of heat and cold in contrast to weather conditions would soon affect many kinds of machinery, but the trucks stand up under every condition.

Long before the city and its suburbs are awake, the big Hood trucks leave on their trips. When blizzards rage and snow is deep, the Hood trucks must break out the roads, for no city or suburb starts such work at so early an hour. This work the trucks have done for the past three years and have been doing all this present winter. There has never yet been a failure of a truck or trailer to deliver its cargo.

The use of teams for heavy hauling was discontinued three winters ago and trucks are replacing even the light delivery teams as rapidly as a team or a horse completes its usefulness.

Milk arrives in great trainloads from the big Hood farms throughout New England, at the Charlestown headquarters. Specially constructed platforms unload the trains, which are backed upon special sidings. The milk then passes through the laboratories, is tested and sorted and is then ready for distribution.

The main building is shaped like a U, trains backing in on three sides while the trucks load from the inside or courtway. The greatest speed must be maintained in handling the product, yet extreme care is equally essential.

For the suburban business, the company uses 20 five-ton Autocars, several of which have been in continuous service since the company started using motor vehicles; and 5 five-ton Pierce-Arrow trucks. In addition there are several Pierce-Arrow tractors of five-ton capacity with trailers, built by the Hood company, of six to ten tons capacity. The use of these tractors and trailers will be gradually increased, for these outfits have proved the most economical of all.

One tractor will easily handle four trailers during the day for the shorter suburban distributing points and the company is planning to increase the number of deliveries in these districts during the coming months.

Loading is handled in this manner: An empty trailer is backed to the loading platform at the end of the day, is jacked up and left there by the tractor. While that trailer is being loaded, other empty trailers are backed up to the loading platform and similarly left, much in the same manner that a freight locomotive shifts its freight cars. When the first trailer is loaded, the tractor backs in picks up the trailer and within a few minutes is on the road to the suburban distributing points.

One of these is located in Malden, Mass., four miles from the Charlestown loading station. The distributing station is not at all elaborate but scrupulously clean. It might be called a shed, with a roof and walls on three sides. The other wall is missing, for the tractor backs its loaded trailer in at this side, jacks it up and leaves it. The shed is large enough to contain two trailers, the full one which the tractor leaves, and the empty one—or the one loaded with empty bottles, which constitutes the return load for the tractor. After the full trailer is left and the empty one removed, a movable platform is lowered in front of the trailer and serves as a loading platform for the delivery teams and lighter trucks which distribute the milk to the stores and houses in that district.

Loaded trucks and trailers carry out the supply of milk every morning and return with empty bottles of the previous day's supply, which are cleaned and sterilized before being loaded for the return trip and again washed and sterilized before being refilled. These distributing stations are located at Malden, four miles from the Charlestown headquarters; Brookline, six miles; Forest Hills, eight

An Outfit That Has Paid for Itself

Five-ton Pierce-Arrow tractor and ten-ton specially constructed trailer, used by H. P. Hood & Sons, milk dealers, Boston. Not one cent of repair expense has been caused by this and similar installations in their 27,000 miles of travel to date.

miles; Quincy, seventeen miles; South Boston, four and a half miles; Lynn, ten miles; Chelsea, four miles; Salem, seventeen miles; Lawrence, twenty-six miles; Cherry Hill Farm, Peabody, twenty-three miles, and Medford, four and one half miles. These distributing stations form two complete circuits about Boston and from them milk is delivered into every community within 30 miles of the Hub.

One loaded trailer of ten tons capacity carries out a freight which is handled by ten trucks or teams of 1-ton capacity each. Formerly, when trucks alone were used, it was necessary to make four or five trips daily to carry the supply now handled by a tractor and two trailers, and in addition, another handling of the freight was necessary to unload the truck, not to mention another icing of the milk in hot weather to keep it sweet, which is now done away with through proper icing of the trailer load before it leaves the company's headquarters at 494 Rutherford Ave., Charlestown.

Each tractor and trailer has a crew consisting of a chauffeur and two helpers. The same is true of each of the big trucks. The trucks are loaded or unloaded in approximately 20 minutes. The trailers take about ten minutes longer owing to their greater capacity.

Company Operates Its Own Garage

The company operates its own garage, nearly opposite its headquarters on Rutherford Ave., Charlestown, and also has a completely equipped service station in Chelsea. At the Charlestown garage is a complete repair and machine shop, where a stock of smaller parts is always on hand. When the operator of a truck drives into the garage, his work is done. A crew at the garage takes full charge, sees that the truck is oiled and gassed and in perfect condition for the next day's work. Sometimes, during the hot weather when the summer resorts about Boston are in full operation, it has been necessary to operate the trucks and trailers continuously with day and night crews and they have made a remarkably fine showing under these conditions.

One of the company's trucks will average 1200 miles a month. The tractors average from 500 to 1200 miles a month, depending upon the haul to which they are assigned. The actual operating cost of the tractor and trailers for the Hood company figures one-third less than the cost of operating the trucks. With the exception of replacing the original springs used on the trailers with heavier ones, the tractors and trailers have been operated without one cent's worth of repairs for over 18 months, while the tractor tires have made similarly remarkable showings, the rear ones having averaged 15,000 miles apiece while the front ones have not been changed during the 18 months that the tractors have been in operation.

The American Truck Body Co., Martinsville, Va., has been chartered, with capital of $100,000, and will manufacture metal truck bodies.

Pneumatic Tire Records Show Lower Truck Operating Cost

The Ohio Furniture Company, Cleveland, Ohio, being sufficiently interested in the operation of its tires to make authentic cost records, has recently completed a six-months' comparative test between pneumatic cord tires and solid tires, with interesting results.

Two trucks were used, identical in make and size, one equipped with pneumatics in front and solids in the rear, and the other equipped all around with pneumatics. At the end of the six months' period the all-pneumatic truck had travelled 6000 miles, or 25 per cent. farther than the other, which had gone 4800 miles.

Repairs on the pneumatic-tired truck amounted to $63.09, while the repairs on the truck with solid tires cost $129.55, giving a saving of $66.46 for the truck with pneumatics.

A still greater proportion of saving is shown in the gasoline record, the solid-tired truck using 1812 gal. in 4800 miles, whereas the pneumatic-tired truck used 1320 gal. while running 6000 miles. At the prevailing rate, this represented a difference of $197.47.

The truck on solids used 504 quarts of oil, or 144 more than the other truck, adding to the credit of the pneumatics the sum of $55.18.

The company's books show that the driver of the truck on pneumatics saved his employer $161.50 in wages in traversing 25 per cent. more ground than the other truck in the same period.

In the matter of depreciation one cent was charged off for every mile run on the pneumatic tires, and three cents per mile on the other, showing a margin of $84 for the pneumatics.

The six months' test showed that the Goodyear pneumatic cord tires on the rear wheels, costing $300, paid for themselves and yielded a profit of $264.61.

Collier Motor Truck Company Elects Officers

At annual meeting of Collier Motor Truck Company, it was revealed to stockholders that there is now on the books of the company a greater volume of business than at any time in the company's history.

The only change made in the board of directors was the appointment of J. F. Corl, succeeding M. E. Crow, of Elkhart, Ind., who recently resigned.

A vote of confidence in the directorate and of appreciation for the efforts and manner in which the business had been conducted, was proposed and passed unanimously.

Immediately following the stockholders' meeting the directors chose the following officers: R. A. Palmer, president; S. H. Penfield, vice-president; J. F. Corl, secretary and treasurer.

Turnbull Appoints Distributors

The Turnbull Motor Truck & Wagon Co. has closed contracts with the following dealers and distributors for the distribution of Defiance trucks: Standard Motor Car Co., Omaha, Neb.; Jackson Motor Co. of Missouri, Kansas City, Mo.; Mound City Buggy & Auto Co., St. Louis, Mo.; Gale Truck & Supply Co., Sioux City, Ia.; R. D. Rockstead, Milwaukee, Wis.; H. W. Elson, Peoria, Ill.; Frank A. Gillis Motor Sales Co., Ltd., Halifax, Nova Scotia; Ohio Valley Implement & Transfer Co., Cincinnati, Ohio; Biscoe & Barnes, Mine Run, Va.; Jefferson Cooperage Co., Ranson, W. Va.; D. T. Reeves & Son, South Boston, Va.; Davis & Wood, Charlottesville, Va.; C. D. Nottingham, Sea View, Va.; Ambia Lumber Co., Ambia, Ind.

Life Insurance Policies for Employees

National Tire & Rubber Co. has presented each of its employees with a life insurance policy, the cost of which is paid entirely by the company. At the time of death of the employee the full amount of the policy will be paid to his beneficiary. There is a special disability clause, whereby in case of permanent disability the amount of the policy will be paid in monthly installments. The policy carries a conversion clause which enables the holder to continue the insurance after leaving the employ of the company. The amount of the policy increases automatically as the employee's time of service increases.

Vulcan Plans Greater Production

The Jenkins Vulcan Spring Co., which devotes entire facilities of its plant to the manufacture of replacement springs, is erecting a factory addition, which, when completed, will bring the monthly capacity to 2000 tons.

The building in course of construction is 350 x 350 ft., with an area of 25,000 sq. ft. of floor space.

The selling force of the company is being increased in porportion to production. Six selling branches will be maintained, and 6000 dealer agencies have been established throughout the country.

Johns-Manville Distributes Bonus on Salaries

H. W. Johns-Manville Co. announces it will distribute to all salaried employees who have been in continuous service for the full calendar year, 1918, an extra compensation of 20 per cent. on the salaries paid them during 1918. This will cost the company approximately $1,000,000.

Clyde Cars Co., of Canada, Ltd., announces the opening of a plant at 73-81 Pearl St., Toronto, Ont., for the assembly and distribution of Clydesdale trucks.

The Remarkable Development of a Daily Motor Express Service

Detroit Man Started With One Truck a Year Ago. Now Has Six, and the Business is Still Growing

JUST a year ago H. A. Ward established a daily motor express line between Detroit and Flint, Mich., a distance of sixty-three miles. To this writing the service has not been interrupted a single day, and an effort is to be made to continue it throughout the winter, although the prospects are enough to terrify any but the most determined. Approximately one-third of the route is paved. The rest ranges from fair to poor dirt in the best of weather, while after a prolonged rain there are stretches that test the power of the best truck. All of which is interesting so far as showing what the trucks will stand, although it is not always conducive to big profits because of the added care the machines require.

Mr. Ward had been in the trucking business in Detroit for some years, and understood it thoroughly before embarking in the interurban field. His equipment consisted of a 3½-ton Packard truck when he went to Flint last spring and interested some of the factories there in motor truck delivery of supplies shipped by boat as far as Detroit. Armed with an order from the traffic manager of one of the big concerns authorizing the boat lines in Detroit to turn over to him any freight consigned to that company, he presented the letter at the dock, and instead of a few cases, as he expected, the clerk slipped him a stack of bills nearly a foot high and invited him to go to it. There were several carloads of stuff, and Ward, to cover himself, was obliged to draft every truck he could hire. However, he got all the stuff there in record time, and thereafter it was usually a case of getting sufficient transportation facilities rather than drumming up outbound freight.

The Ward fleet was increased as fast as possible, with the result that today there are six trucks, while trailers are to be added. Extra machines were hired whenever necessary, and some days there would be as many as twelve or fourteen trucks on the road for Mr. Ward.

Little attention was paid to small package freight, as it was found that there were larger returns in handling bulk shipments. Deliveries were advertised to and from way points, and there is a fixed rate per 100 lb. for all towns along the route, but the tendency has been to dodge this sort of business.

Why the Small Package Freight Doesn't Pay

"The reason we kept away from local shipments was purely monetary," said Mr. Ward, "an easily demonstrable fact. Our rate per 100 lb. from Detroit to Farmington, which is approximately one-third the entire distance, is 20c. It is 65c. to Flint. We might take 500 lb. of freight as far as Farmington, and not pick up a pound from there destined to Flint. Consequently, for the last two-thirds of the trip there was 500 lb. of carrying capacity that was idle, and the proportion of unused tonnage increased as local shipments were dropped off along the line. Our experience has been that if you are going to make any money with a truck you must keep it loaded pretty close to capacity all the time. So we stuck out for the through business, of course, accepting local shipments when they were tendered, more as a matter of policy than revenue.

"One other lesson we learned in short order, and that was that a quick way to lose money is to pick up shipments from farmers along the way. It is all very well to take up a magazine and read of what is being done in this line—in other states. It may be possible where highway conditions are good. But in Michigan, except in midsummer, the minute you turn a truck off the main highway you are due for trouble. Even if you are not held up unduly by bad roads, the time consumed more than eats up any possible profit.

The Back Road Just as Important as the Main Highway

"Universal freight service is a fine thing, theoretically, and it may work out in some parts of the country. But the first step toward consummation of the plan is to get decent back roads. Along our route, for example, during the months when farm produce should be moving to market freely on trucks, the farmer a half mile off the main highway might as well be miles away so far as reaching him with a truck is concerned.

"The farmer on the trunk line highway has every advantage in this respect—and he is quite apt to be the fellow who owns his own truck. We experimented for some time, and in every instance we could figure out a loss.

"I cite this merely as illustrating one of the big problems confronting the motor transport committees of the war board and the various other agencies conducting campaigns."

The Ward line traverses two routes between Detroit and Flint, the trucks

A Portion of the Fleet Used by the H. A. Ward Cartage Company, Detroit

alternating. One is by way of Pontiac, Waterford, Clarkston, and thence to Holly and Flint. The other is out Grand River road to New Hudson, and north through Milford to Holly and Flint.

Under ordinary conditions seven hours is allowed for the 63 miles. Including time for meals and "doping" the truck, a ten-hour day has passed. There is no restriction on a driver making a return trip at night if he sees fit, and this is often done, the man being given an extra day's pay. Drivers are on a weekly wage basis, payment on mileage having been found to offer too great a temptation to abuse a machine. The driver is required to keep his machine plentifully supplied with oil and grease, Mr. Ward is a stickler in this respect.

Trucks Are Oiled and Greased Enroute

One idea introduced by Mr. Ward in this connection may furnish a suggestion to other truck owners. Much of the freight handled during the summer months arrives by boat, and with truckmen it is a case of first come first served. The Ward trucks leave the garage at an early hour, take their place in line at the docks, and while waiting their turn to get to the loading platform the drivers supply the trucks with oil and grease. In this manner, without getting down to the garage any earlier, they are able to get well up toward the head of the line.

The method of handling freight varies according to local conditions. In Detroit a spacious warehouse is maintained at 40 Randolph St. No pickups are made of less than one-ton shipments, smaller consignors making deliveries to the warehouse and being given a receipt. On inbound freight, except truck lots or ton shipments, the goods are unloaded at the warehouse and the consignee is notified. If he wants the stuff delivered, an express company is notified from the Ward offices, and the consignee pays the charges upon delivery.

In Flint a local freight office is maintained, and deliveries are made, the district served being sufficiently restricted in area to make this possible. An agent is employed to look after new business at the end of the line and see that deliveries are made.

The company has recently established a line to Toledo, where the General Fireproof Storage Co. is its representative. It pays the company a stated rate for shipments secured, and bears a part of the expense of the warehouseman, this arrangement proving very satisfactory. Deliveries in Toledo are handled the same as in Detroit. With the exception of truck loads billed direct from Flint to Toledo or vice versa, everything is transshipped in Detroit, the local warehouse being arranged with inside and outside docks and ample storage space.

The regular equipment consists of two 5-ton, two 3½-ton, one 3-ton and one 2-ton truck.

The Ward line has had a measure of opposition from "snipers," as independent truck operators are termed, the class whose chief claim to consideration on the part of the shipper is that they cut the standard rates a bit. The temptation to underbid is strong on the part of the truck owner who does not understand the requirements of the business, or the expense involved, and who can figure no farther than the cost of gasoline, oil, tires and his own daily wage.

"The 'snipers' have never really risen to the dignity of competitors," said Mr. Ward. "We have repeatedly had them jump in and underbid us—but they never lasted for any length of time, because they didn't understand the business, and lost money. Really, I think they did us much more good than harm. The average shipper is concerned first of all with regular service that takes a consignment off his hands and leaves him nothing to worry about. If you can show a manufacturer or a wholesaler that you are absolutely dependable there is little to fear from 'snipers.'"

New Hand-Book of Automobiles Issued by N. A. C. C.

NEW YORK CITY, Feb. 20.—In the Sixteenth Annual Hand Book of Automobiles, just issued by the National Automobile Chamber of Commerce, New York, are shown detailed and uniform specifications of the principal models of motor cars and motor trucks produced by the leading manufacturers in the United States, who are members of the N. A. C. C.

The gasoline commercial section includes 70 models and illustrations.

The Hand Book of the American industry is a useful reference book for domestic and foreign dealers, export houses, American consuls, Secretaries of State, libraries, dealers' associations, etc The specifications are in tabular form and follow a uniform arrangement for ready reference and comparison. Copies of the Hand Book of 205 pages are supplied to dealers and the public, at the nominal price of twenty-five cents to cover the cost of printing and mailing.

Trade Literature

Truing Up Wheels is the first of a new series of tire conservation booklets issued by the Goodyear Tire & Rubber Co., Akron, O. It shows the wear that an automobile tire undergoes when it is out of alignment and gives the suggestion that wheels be tested thoroughly after the car has had severe jolts. The method by which any car owner may determine, in a short time, whether his wheels are out of alignment, is given in simple detail and with ample illustrations. Copies may be had by motorists on application to Goodyear service stations or to the company's main office at Akron, O.

How to Apply Goodyear Pneumatic Cord Truck Tires.—This is an illustrated pamphlet showing the best methods of applying pnematic tires to trucks and passenger cars. Each step in the operation of mounting these tires is outlined and illustrated in detail. There are likewise truck tire load and tire inflation pressure tables, as well as a few hints on the proper care of tires. The booklets are free for the asking at the Goodyear service stations throughout the country or may be had on application at the main office of the Goodyear Tire & Rubber Co., Akron, O.

"The Birth of a Wheel" is the unique title of an interesting booklet just published by the Clark Equipment Company, Buchanan, Mich., manufacturer of Clark disc steel wheels and Celfor internal gear axles. It shows photographically the successive steps in the evolution of a disc steel wheel. Copies will be mailed on request.

Star Rubber Company Opens New Branches

With a view to serving its dealers in the Northeast and Southeast more efficiently, the Star Rubber Company has established direct factory wholesale branches in New York City and Atlanta. The former will serve the territory embracing New York, the six New England States and eastern Pennsylvania, and the latter will cover the Carolinas, Georgia, Florida, Mississippi, Louisiana, Tennessee and Alabama.

The New York branch is located at 226 W. 52nd St., and the Atlanta branch is at 328 Peachtree St. Neither of the branches will have retail departments.

C. R. Wilson Plant Burns

DETROIT, Feb. 17.—The three upper floors of the five-story construction building of the C. R. Wilson Body Co. were destroyed by fire on Feb. 14. The loss is estimated at between $300,000 and $500,000. It was fully covered by insurance.

Craig-Wyman Co., Inc., 93 Massachusetts Ave., Boston, Mass., report that their business for January was four times as great as in January, 1918, and that during the first eight days of February business equalled that for the entire month of February, 1918. This company has the agency for the Gill piston ring in Boston territory.

Sparks-Withington Co., Jackson, Mich., manufacturer of Sparton horns, fans, vacuum tanks and radiators, is planning to establish a plant in Cleveland for the production of Sparton radiators.

McKinney Co., Chicago, Ill., advertising, has succeeded the Charles C. McKinney Service. The officers of the McKinney Co. are: C. C. McKinney, president; O. D. McKinney, vice-president, and L. J. Sholty, secretary. The company has taken additional space and new quarters, at 58 E. Washington St.

Be a Good Roads Booster!

Most Miles per Dollar

FIRST

Truck users naturally think of Firestone Tire equipment *first,* because Firestone is and always has been *first* in this field, from the earliest inventions and improvements in solid truck tires to the latest developments in giant cord tires. That is why

Over half the truck tonnage of America is carried on

Firestone

Truck Tires

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, OHIO
BRANCHES AND DEALERS EVERYWHERE

The S. A. E. in the War and Afterwards

NO engineering society rendered greater service to the United States Government during the war than did the Society of Automotive Engineers. When the history of the war is written it may well be found that automotive supremacy was the deciding factor. The superiority of the Allied motor transport system and the Allied supremacy in the air had an immediate bearing upon Allied victory. These facts are well known to those who are familiar with the work of the S. A. E. in the war. The Society has done its bit, and its record is one of which its members are justly proud.

The part played by the automotive engineer was truly of great importance, and through its membership, as well as in more direct ways, the influence of the S. A. E. was felt in no uncertain manner and to the great benefit of this and allied countries in the prosecution of the war.

To tell the whole story of S. A. E. work in the war would require a volume, but some of the more conspicuous accomplishments are here recorded and are worthy of the consideration of those who would know how great a service the Society has rendered.

The S. A. E. and Truck Standardization

For several months prior to the entry of this country into the war, committees of the Society, at the request of the Transportation Division of the Quartermaster Department, made a careful study of military truck specifications, starting with a draft originally prepared by that department.

The engineers engaged in this work were those who had long been intimately associated with the design and production of commercial trucks. The specifications adopted as a result of these deliberations did not constitute a standard of the Society, except insofar as S. A. E. standards already existing were incorporated, since it was then as it has always been in the past and continues to be the policy of the Society never to establish standards involving the design of a complete automotive vehicle or of the various assembly units which go to make up such a vehicle, but rather to confine attention to such details as offer practically no legitimate grounds for creating a design not in harmony with standard practice.

Shortly after the adoption of these specifications by the War Department, it developed that the product of many of the parts manufacturers did not fulfill the specifications. As a result there were called meetings of manufacturers of transmissions, engines, axles, springs, universal joints, radiators, etc., the purpose being, not to modify the War Department specifications, but to bring about such interpretation of them as would result in the production of parts as well as complete trucks in sufficient number to supply the army adequately with trucks of the type desired, and composed of interchangeable assembly units so far as possible. In some cases it became evident that the parts of units of the different makes might well be made interchangeable.

Partly as a result of these conferences and partly from lessons learned in observing the performance of various makes of trucks on the Mexican border, and in use by the Allied armies, the Government reached the conclusion that no make of commercial truck fulfilled as well as was desired the severe conditions which it had become apparent a military truck would be called upon to fulfill. Therefore, in July, 1917, a meeting was called at Columbus, Ohio, for the purpose of carrying to a logical conclusion the work considered in prior conferences. Everyone legitimately interested, so far as was known, was invited to attend. Sixty truck manufacturing companies were requested to have their engineers and executives attend to comment upon the work. A full and frank discussion was asked for at the meeting for the purpose of closing the matter in such a way as to bring the best results in the design and production of a truck especially suited for army transport service. A number of truck manufacturers offered objections at the meeting to standardization work of this character. The government representative present announced that truck models for military use would be completely standardized, and that there was sufficient time for carrying through such a program.

At this point the Government took over completely the work of standardizing its truck equipment. The Society as such did not pursue the matter further, from that time forward, although many of its members were intimately connected with the work undertaken.

The result has been a truck, designed especially for military purposes, and regarded by many engineers of the Army and others in an excellent position to judge of its merits, as the best truck for such purposes in existence.

The work thus accomplished was the subject of special recognition on the part of the Secretary of War, who publicly thanked the Society and its members for the patriotic service rendered.

As a logical development of this work a separate department of the Army known as the Motor Transport Corps has been organized, and a program of complete standardization of trucks used for military purposes adopted. Thus the Army was enabled to concentrate on the production of a few standardized models for trucks instead of being under the necessity of furnishing parts for the keeping in operation some thirty odd different makes, or models. Just what this would have meant had the war continued is easy for one who has handled the spare parts problem to realize.

As another logical outcome of the the work in which the S. A. E. co-operated there has been established an engineering department of the Motor Transport Corps, the function of which is to handle the design of all motor driven vehicles required for transport service in the Army. Such a department was a prime necessity and has already eliminated much unnecessary duplication of effort.

Early Co-operation With Council of National Defense

The S. A. E. was one of the first engineering organizations to offer its services to the Government, after the declaration of war on Germany. One early result of this offer of co-operation was the creation of an automotive transport committee composed of members of the Society and representing each of the major branches of the Automotive Products Section of the War Industries Board, an organization which rendered very valuable service not only to our own country, but to the allied governments whose representatives sought its advice in the purchase of many varieties of automotive apparatus.

Even before the creation of this committee, the Society, at the request of the Secretary of the Navy, appointed two of its members, who had been presidents of the Society, members of the Naval Consulting Board, an organization which rendered very valuable service to the Nation. One of these past presidents later became chairman of the Aircraft Board, a group of patriotic men of affairs which, though they labored under great difficulties, performed service of unquestioned value to the Government, among other things arranging for the design and production of the Liberty engine. This engine, as is now well known, proved suitable for production in large quantities, figured largely in the plans of the Allies for driving the Hun from the air and carried the war deep into enemy territory. This accomplishment added another page to the achievements of American automotive engineers during the war.

The development work on the Liberty engine, as well as most elaborate preparation for its production, was carried out in large part by members of the Society. It is indeed true that the Society as such had little to do either with the design or the development of the Liberty engine. It was, however, distinctly the product of standardization, and standardization has been fostered by the S. A. E. as in no other society. In fact through the activities of the Society probably more than in any other way, automotive engineers have come to think in terms of standardization, without which a product such as the Liberty engine is quite impossible, at least so far

The Steering Gear *and* its Importance

ROSS GEARS

WHILE the steering gear is far from being the most expensive unit in the truck, most engineers will agree that it is one of the most important.

Considering the element of safety, there is no other part upon which so much dependence must be placed. Every minute that it is in operation, the *safety* of the truck and its load depends largely upon the *steering gear.*

The steering wheel is the chief point of contact which the driver has with his truck — the mechanism through which he *knows* it most intimately. He will like it or dislike it and his efficiency will be increased or decreased according to the ease with which the truck steers.

That these vital points were carefully and successfully considered in the design of the Ross Steering Gears is demonstrated in the esteem in which they are held by motor truck engineers. Over 115 manufacturers, representing considerably over half the industry, are now using them as standard equipment, among the number being many of the largest and best known makers in the country.

The special feature of Ross Gears which distinguishes them from all others is the screw and nut mechanism which transfers the rotation of the steering wheel to the steering arm. The nut is a solid piece, completely enveloping the screw, so that the *entire bearing surfaces of the threads of both screw and nut are utilized.*

These enormous bearing surfaces, together with the quality of Ross material and workmanship, guarantee *easy steering* and *reliable* and *satisfactory service.*

Write for catalog and any special information desired.

The SCREW

This screw is completely enveloped by the nut, thus utilizing all of the bearing surface of every thread in both screw and nut.

The NUT

This nut travels up or down inside the steering gear housing, rotating the cylindrical discs in their recesses. These discs receive the projecting arms of the trunnion shaft and rotate it in turn.

Compare the enormous bearing surfaces thus shown in Ross Steering Gears with other designs in which only three or four teeth are in contact at one time.

The TRUNNION SHAFT

This shaft moves the steering arm forward or backward when it is rotated, through its projecting arms by the rotation of the cylindrical discs in the nut.

The Steering Gears *that* PREDOMINATE *on* Motor Trucks

ROSS GEAR & TOOL COMPANY, 760 Heath St., Lafayette, Ind.

as quantity production is concerned. Many standards created by the Society prior to the war were incorporated in the Liberty engine. The Society also assisted in the creation of many other standards of great importance in the aircraft field.

War Work in the Tractor Field

Among the various problems that confronted the Army at the time of the entry of this country into the war, was that involving the design and production of tractors suitable for the haulage of ordnance and ordnance supplies. To this was later added work of a similar character in connection with army vehicles commonly known as tanks.

In this work members of the Society again played a prominent part. One of its past presidents was placed in charge of tank engineering work, and a past vice-president in charge of work involving the design of tractors for the haulage of artillery in the field, as well as for the handling of ammunition, ordnance repair shops and the like. This work involved not only the preparation of design, but production in such great quantities as would truly have amazed the German had he been able to hold out long enough to witness the opening of a campaign in 1919. Those who do not know how much was accomplished in this field, not only by those who took the prominent part, but also by many who did splendid work as subordinates of all grades, from draftsmen to chief engineers, will find it difficult to appreciate what a terrible punishment was meted out to the foe. Had he chosen or been able to hold out a few months longer, he would have been faced by mobile guns, so designed as to be quickly moved by independent tractors, and by others mounted directly on tractors which can change their position in an incredibly short time, and thus render it virtually impossibly for enemy aircraft to "spot" with sufficient accuracy to enable opposing artillery to get a correct range and direction. Such equipment was designed and in process of development and construction by automotive engineers, long before the armistice was signed. By its use so rapid would be the advance once started that nothing but surrender could have saved the foe from utter destruction. In short, through the efforts of the automotive engineer provision had been made whereby the entire Army would soon be, as it were, mounted upon self propelled vehicles of such type that even the destruction of roads would have been of little moment, since the vehicle could negotiate almost any kind of ground. The speed of the Army would thus be increased many fold in all matters pertaining to the transport of the vast paraphernalia required in a campaign. In this way the progress of land operators has been speeded up by the creation of new automotive vehicles, and a greater utilization of those types which have been employed for many years. The German may well count himself fortunate that he did not have to face another campaign. Such knowledge as he must have gained concerning the vast production of such apparatus as has been here mentioned was an element which contributed largely to a defeat which came earlier than even the optimistic had thought possible. Well may those who have not contemplated fully the possibilities of the situation thus created by the automotive engineer pause to consider how great a part he played, after all, in putting an end to the world conflict.

The S. A. E. is believed to have been the only engineering Society which maintained an office and staff in Washington during substantially the entire period of the war. This office was the means for keeping in close contact with the requirements of the Government, in many instances rendering assistance in solution of various problems as they arose and at other times assisting to procure men especially qualified for certain classes of work, who would otherwise have been extremely difficult to locate, if not unobtainable.

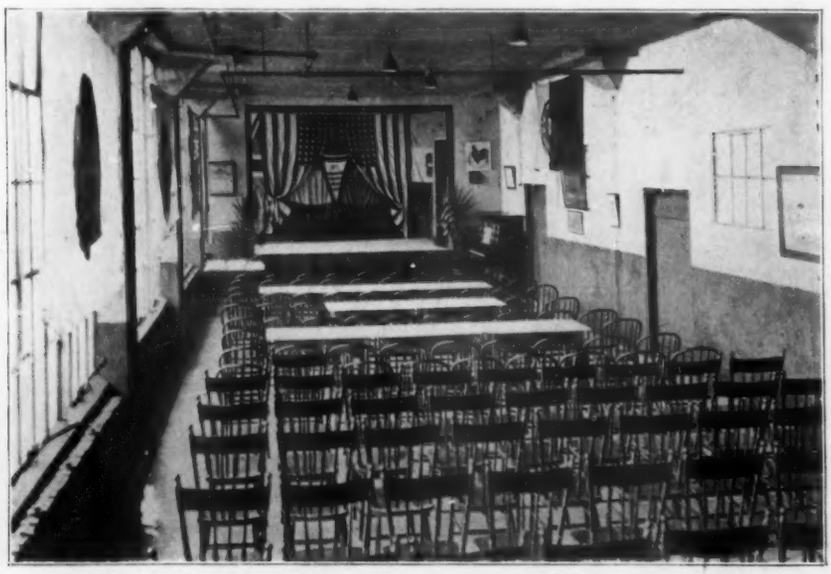
To assist in accomplishing this task, a census of the entire membership of the Society was taken early in the war and the blanks returned, carefully classified for the frequent reference to which they were later put.

It should not be forgotten, moreover, that hundreds of members of the Society performed patriotic service of importance second to none by sticking to their work at home and assisting in the production of automotive apparatus, without which our armies would have been impotent to withstand the onset of the German horde. No small measure of credit is due to those men who stood by the guns at home, and without sharing in the glory of our fighting forces, contributed very largely to the success our armies achieved.

The Society's Post-War Activities

With such a splendid record of achievements during the war to its credit, the Society is prepared for, and is, in fact, already at work on problems growing out of the war and is helping to bring about a speedy solution.

How are aircraft production facilities to be utilized commercially? How is the problem of more efficient use of fuel necessary to conserve a limited supply to be met? How is the need for a greater and ever-increasing supply of food to be met in the face of a shortage of labor? How is the distribution of food and other commodities to communities not on the railway to be accomplished? How can better international relations among engineers, and in engineering and standardization matters be brought about? How can the automotive engineer contribute to the successful solution of those problems which must be solved if this country is to be a successful competitor in the markets of the world? How can lighter, more efficient and less expensive automotive apparatus be produced? All of these are questions in which the automotive engineer has a vital interest. There are many others of like nature. Exchange of ideas among engineers will help in their solution. The creation of carefully considered standards will be another element in their solution. The stimulation of research in new fields will have no small bearing in contributing to the desired result. All of these are exactly in line with the aims of the Society, and are in fact the things for which the Society stands.



How Bantam Ball Bearing Company Provides for Well-Being of Its Employees

The latest kink in the efficiency system of the Bantam Ball Bearing Company, Litchfield, Conn., is the auditorium shown above. This auditorium is built in the factory proper, is 80 x 20 feet, and seats about 250 people. It has a stage, moving picture machines, comfortable chairs, tables, reading matter, and everything that contributes to comfort and relaxation. Each noon this room is used as a lunch and recreation center, and an interesting program of varied amusements is arranged for every evening of the week. The auditorium is for the use of all employees of the company as well as members of their families, not employed elsewhere.

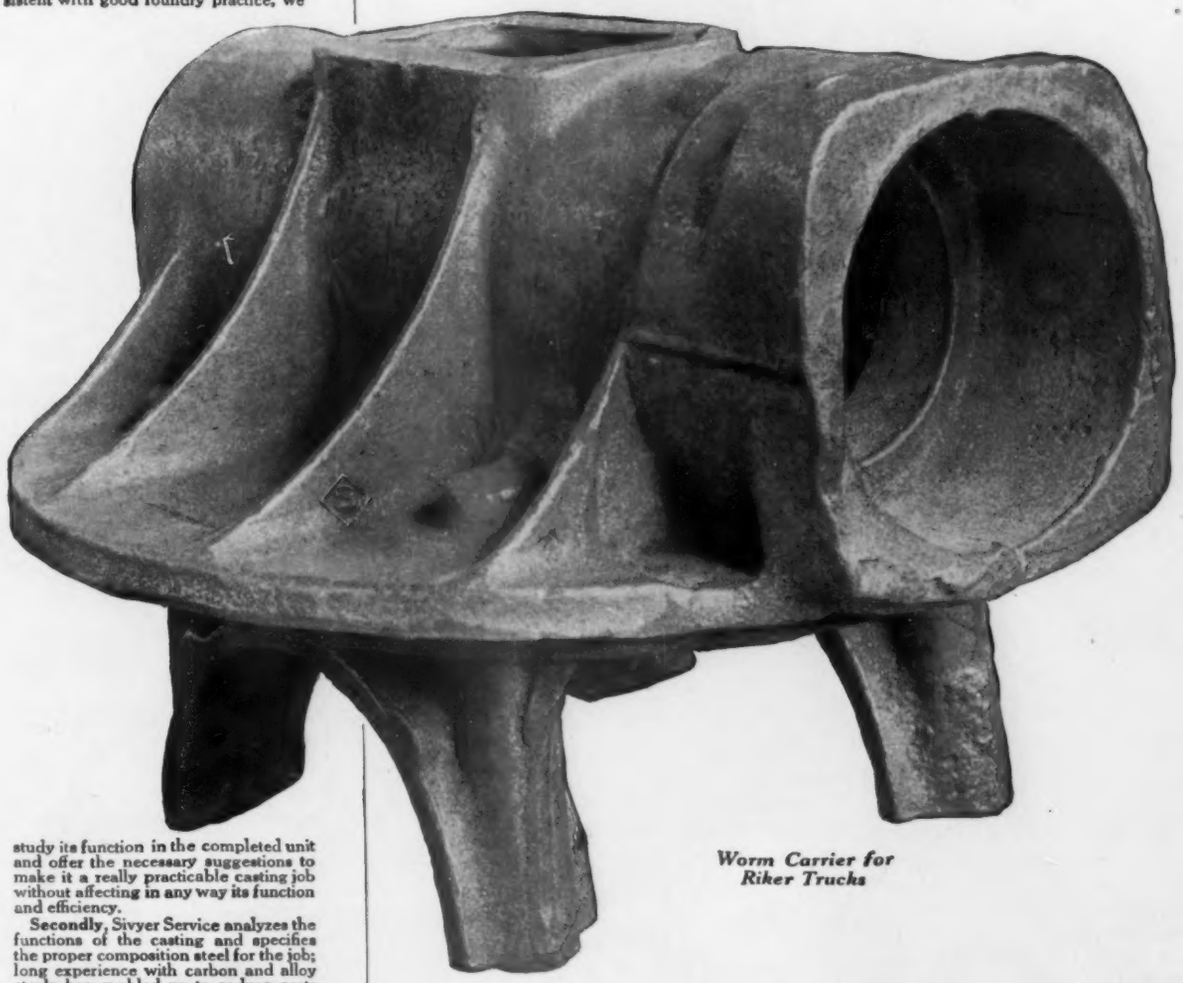
The Sivyer Service of providing Electric Steel Castings has for its objects the decrease of machining costs and the increase of wearing-quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency.

Secondly, Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly, Sivyer Service makes a careful study of the pattern and molding problems involved, for improper gating and insufficient risers are often the greatest wasters of machining labor and metal.

Fourthly, Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short, the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little even on the natural freedom of electric steel from occluded gases and on its commonly recognized merit in resisting crystallization. It also depends but little on the inherent scientific accuracy of the electric furnace process. From casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.

SIVYER S CASTINGS



Worm Carrier for Riker Trucks

SUCCESSFUL solutions of the molding and riser problems involved in making such parts as worm carriers are typical of Sivyer Castings. Proper coring out, and the avoidance of shrink holes and cracks where the thin parts join the thick, mean much to the truck manufacturer in the matter of reduced machining costs. And they mean still more to him, and to the user of his product, by making sure of strength and long life.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

State Regulation of British Automobile Traffic

Scheme of Co-ordination to Minimize Overlapping May be Permanently Continued in Modified Form

By OUR BRITISH CORRESPONDENT

As in the United States, so in Great Britain the war has made people realize that road transport is a matter of vital national importance, and the stress of the struggle has led to a degree of control which would have been quite impossible in normal times of peace. The result is a certain amount of state organization, and as that organization might conceivably be continued in a modified form in the future, it is worth careful study.

Apart from the control of motor fuel which was instituted comparatively early in the campaign, and has not been handled with any striking ability, the British government control of transport began with the formation of the Road Transport Board in February, 1918. To quote the official terms of reference, the purpose of this body is: "To co-ordinate the work of existing government departments in connection with road transport; to determine what further measures are necessary to ensure the most economic use of road transport vehicles, and their efficient allocation for meeting such requirements as may arise from time to time for the transport of food, munitions and other war material, and for the essential needs of the trade and industry of the country; and, subject to the direction of the Board of Trade, to give executive effect thereto."

For the purposes of administration the country was divided into 13 divisions, which are identical with those adopted by the Ministry of Food. Each of these divisions is controlled by a divisional committee, and is further sub-divided into areas, each in charge of an area road transport committee. In the 13 divisions there are 84 areas in all. The Transport Board has absorbed into its organization some 300 local transport sub-committees of the Food Control organization, and about 30 local horse transport committees appointed by the Board of Trade. Consequently on the divisional trades, the Divisional Food Commissioner and the Munitions Transport Officer were represented, as well as the road transport trade interests, local interests generally, and the Chamber of Commerce. The area committees, limited to 11 members, as a rule comprise four representatives of Food Transport (chosen by the Food Control Committees within the area), four of transport other than food and of general local interests, two representatives of horse traction, and one of munitions transport. Both the central body and the divisional boards are assisted by advisory committees.

Though the problem at the outset was largely one of meeting threatened disorganization of food distribution, owing to transport shortage, the primary object of the Road Transport Board was to obtain the maximum of efficiency out of existing means. The amount of road transport being governed by supplies of fuel and food, all unnecessary traffic arising from overlapping or duplication had to be eliminated as far as possible.

With this object, then, some degree of co-ordination had to be obtained either on a geographical or trade basis. The first step was to form a register of all freight-carrying road transport vehicles with road capacities over 1700 lb., and all owners of such machines were required to register their vehicles. Thus, the board obtained full information as to the number and distribution of automobiles, with particulars of their load capacities, purposes of use, areas of operation, etc.

The next step was to issue permits on a system of priority based on the uses of the vehicles.

The energies of the local organization were next mainly directed towards co-ordination, and much work of a preliminary nature has already been accomplished. In some divisions co-ordination of deliveries has been secured. In Birmingham, Exeter, Cheltenham and Gloucester for instance, restrictions of retail bread deliveries were voluntarily accepted by the trade, and in other parts of the country various other trades have been approached with the same object.

To Lessen Light or Empty Mileage

But the most practical results so far have been obtained with the return loads bureaus that have been instituted in the Birmingham, Manchester and Bristol districts. As an example, an experimental office was recently opened in Bristol, and within two months over 5000 tons of freight have been moved by vehicles which would otherwise have traveled light or empty.

This organization largely depends on the telephone. Of course such a system has its limitations, but even if these are recognized very fully, it can show an enormous saving over the haphazard, sporadic working of privately owned trucks used exclusively on their owner's service.

The Automobile Truck as a Strike Safeguard

In these days of national movement, national organization of resources follows as an inevitable corollary, and already the value of national transport organization has shown itself in emergency. The recent railway strike last autumn served as a test for the Transport Board's organization. In southern England and South Wales urgent supplies of foodstuffs were held up, and the organization of the board was immediately placed at the disposal of the Food Ministry. Large numbers of trucks were rapidly concentrated, supplies were quickly moved by road to centers where they were urgently needed, and workers carried to and from the work despite the absence of railways. In fact all requests for the provision of road transport during the strike were fully met.

With the present labor unsettlement it looks as if this organization would have to be kept in being if the security of the public is to be safeguarded, for strikes can be begun much more quickly than their immediate effects can be neutralized.

Returned Soldiers Interested in Automobile Mechanics

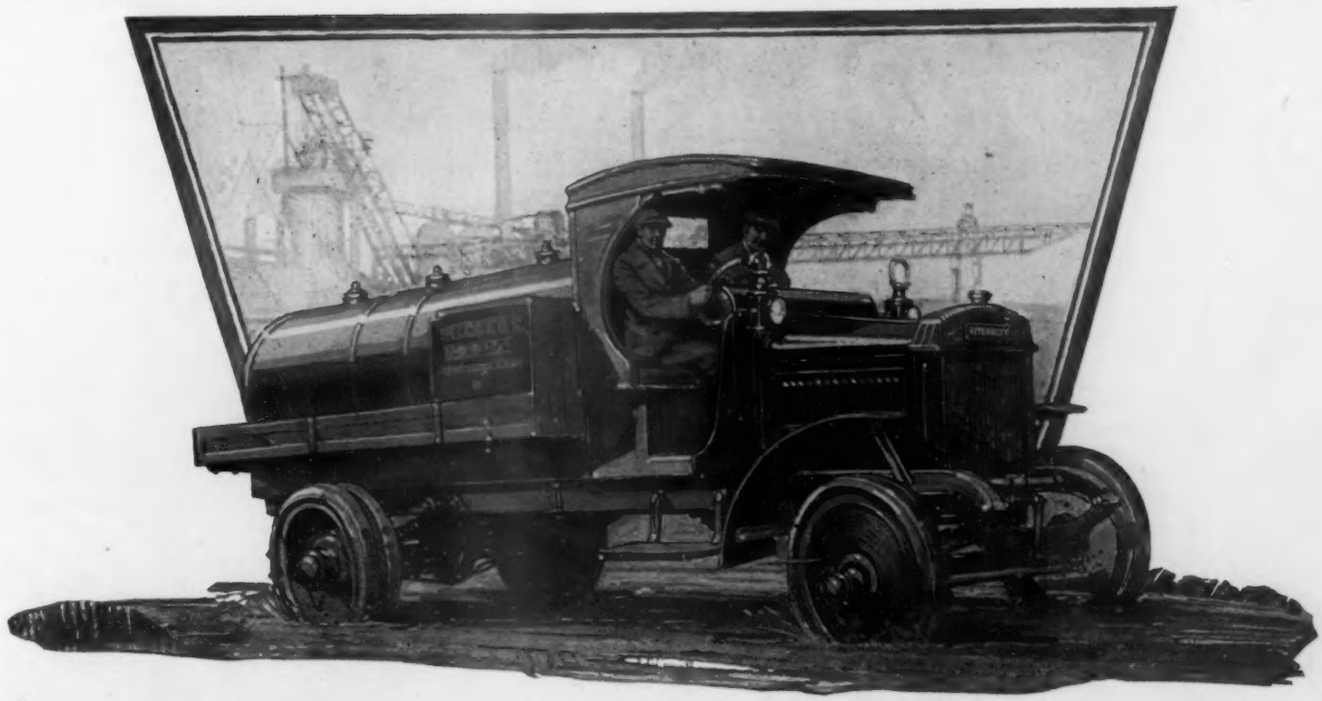
WASHINGTON, Feb. 28.—Keen interest is being manifested by returned soldiers from France under treatment at half a hundred hospitals throughout the United States, in various phases of educational work to which their attention is being directed. Probably 15,000 disabled soldiers are now being given instruction in one or more subjects in these hospitals. Auto mechanics, tractor operating, machine shop work and agriculture seem to appeal particularly to these men.

In view of the apparent preference shown for instruction in the subjects suggested, the Surgeon General's office of the War Department is authority for the statement that instructors and supervisors are still needed for almost all lines of technical work.

In harmony with this plan for educating men in hospitals along useful lines, the Department of Labor, through its information and education service, has opened two zone offices, one at 16 E. 42nd St., New York City, and one at 63 E. Adams St., Chicago, for the purpose of looking after the thousands of experts among the officers and men who are being discharged from the Army and Navy.

This work, in the Department of Labor, is known as the Professional and Special Section, and is in charge of I. W. Litchfield.

Great care is taken in referring to these discharged experts. No man is referred to an employer until after he has had a thorough examination by one or more trained examiners of the Professional Section.



$30,000 net— that is what this Atterbury dealer* made in first eight months —

*name on request

The dealer who made this record is no exception to the Atterbury rule—

—And we can tell you of many other Atterbury dealers who are becoming wealthy men.

10 years of truck making experience behind each ATTERBURY

And here are three big reasons:

1. Atterbury dealers do *not* have to spend their profits in service after a truck is sold.
2. Atterbury *owners* in every city are eager *salesmen* for the Atterbury.
3. Atterbury national advertising helps ease the way for continual growth in Atterbury sales.

If you want this valuable franchise write or wire today

ATTERBURY MOTOR CAR COMPANY
BUFFALO, N. Y.

ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

Who's Who in Reconstructive Work

Organization of Government Committees With Which the Automotive Industry is Concerned

Council of National Defense

Secretary of War, Chairman.
Secretary of Navy.
Secretary of Interior.
Secretary of Agriculture.
Secretary of Commerce.
Secretary of Labor.
Grosvenor B. Clarkson, Director.

Advisory Commission

Daniel Willard, President, B. & O. R. R., Chairman.
Howard E. Coffin, Vice President, Hudson Motor Car Co.
Julius Rosenwald, President, Sears, Roebuck Co.
B. M. Baruch, banker.
Dr. Hollis Godfrey, President, Drexel Institute.
Samuel Gompers, President, American Federation of Labor.
Dr. Franklin Martin, Secretary, Gen. American College of Surgery.
Grosvenor B. Clarkson, Acting Director.

National Automobile Chamber of Commerce

Second National Bank Building, 509 Seventh St.

Hugh Chalmers, Vice-President of the N. A. C. C., is acting as Washington representative of the N. A. C. C. members. A staff consisting principally of engineers is assisting Mr. Chalmers in giving information to automobile manufacturers in connection with government work. Alfred Reeves, Gen. Mgr. of the N. A. C. C., spends a large part of his time in Washington, in connection with the various interests of the automobile industry.

Highways Transport Committee

944 Munsey Bldg.

This committee was appointed by the Council of National Defense, to assist in making most efficient use of highways as one of the means of strengthening the Nation's transportation resources. The most important policies thus far adopted are: (1) To increase highways transport resources, and curtail waste by eliminating the running of vehicles empty. Return Load Bureaus have been established for this purpose. (2) To make more food available and save farm labor for work on farms. Rural Motor Truck Express routes for agricultural areas to consuming centers or important shipping points are advocated. (3) To make highway transportation more economical and effective by encouraging the use of power driven vehicles. (4) To assist the Railroad Administration in the elimination of the terminal congestion.

John S. Cravens, Chairman.
Chas. W. Reid, Secretary.
Lee Lamar Robinson, Director of educational work.

Advisory to Highways Transport Committee

Raymond Beck.
Wm. Phelps Eno.
Thomas D. Knight.
C. A. Musselman.
Lee Lamar Robinson.
John T. Stockton.

Motor Truck Committee of the N. A. C. C.

This Committee was organized for the purpose of co-operating with the Highways Transport Committee, in matters pertaining to motor truck haulage, and to give to builders of motor trucks of the United States such assistance as they may call for. It carries the authority of the N. A. C. C.

George M. Graham, Chairman.
W. T. White.
M. L. Pulcher.
David Ludlum.
D. C. Fenner.
S. A. Miles, in charge of rural motor delivery feature of the committee's activities.

Motors Division, Quartermaster Corps

This division procures motorized vehicles for the Motor Transport Corps.

Col. Fred Glover, Chief.
Maj. Guy Hutchinson, Executive Officer.
Col. E. S. George, Assistant Chief.
Maj. A. H. Zacharias, Production Assistant.
Maj. C. S. Dahlquist, Technical Assistant.

Procurement Branch

Maj. A. H. Browne, A and B trucks.
Capt. A. C. Keleher, Militor trucks.
Maj. W. T. Fishleigh, AA trucks, ambulances, automobiles.
Maj. R. Miller, Jr., special vehicles, motorcycles, bicycles.
Guy Morgan, spare parts, accessories, tires.
James Morrison, bodies.
Lt. W. J. Kennedy, orders.
D. F. Hess, priorities.
Capt. E. P. Hangliter, gauges.

Administrative Branch

Capt. S. P. Dean, Chief.
Capt. A. D. Stansell, Office Control.
W. A. Dickey, Personnel.
D. G. Blair, Clearances.
A. G. Drefs, Finance and Statistics.
Capt. H. M. Lowy, Trucks.

District Offices

Maj. M. B. Edgerton, Chicago.
Capt. D. S. Devore, Cleveland.
Maj. E. L. Jaco, New York.
Maj. G. D. Wilcox, Detroit.

Motor Transport Corps

Seventh and B Sts.

This Division has charge of engineering, operation and maintenance of all motor vehicles except tanks, caterpillars and other artillery tractors, for all divisions of the United States Army in this country, as well as overseas. Also supervises maintenance, operation and inspection of motor-driven vehicles, motor repair shops and garages.

Brig. Gen. C. B. Drake, Director.
Col. J. F. Furlow, Asst. Director.
Col. C. Seamon, Asst. Director.
Col. W. H. Noble, Asst. Director.

United States Railroad Administration

Regional Directors:

A. H. Smith, Eastern Territory, Grand Central Terminal, New York City.
N. D. Maher, Pocahontas Region, Roanoke, Va.
B. L. Winchell, Southern Division, Healey Bldg., Atlanta, Ga.
R. H. Aishton, Northwestern Territory, 226 W. Jackson Blvd., Chicago, Ill.

Division of Capital Expenditure, United States Railroad Administration

Robert S. Lovett, Director.

United States Employment Service, Department of Labor

Main Office, 916 16th St., N. W., Washington, D. C.

John B. Dinsmore, Director General.
C. T. Clayton, Asst. Gen. Dir.
N. A. Smyth, Act. Asst. Dir. Gen., Sec. of Policies and Planning Board, Chief Common Labor Section.
T. B. Powderly, Chief, Division of Information, Administration and Clearance.
M. A. Coykendall, Chief, Division of Farm Service.
W. E. Hall, Chief and National Director of Public Service Reserve and Boys' Working Reserve.
R. W. Babson, Chief, Division Inquiry and Education.
I. W. Litchfield, Chief, Clearance Section (Skilled Labor).
S. W. Mason, Chief Clerk.
James L. Hughes, Asst. to Dir. Gen.

District Superintendents

District 1—H. A. Stevens, 53 Canal St., Boston, Mass.
District 2—J. R. O'Leary, 22 E. 22nd St., New York City.
District 3—J. C. Saylor, Old Federal Bldg., Wilmington, Del.
District 4—J. W. Reynolds, Cleveland, Ohio.
District 5—Ralph Izard, 810 E. Main St., Richmond, Va.
District 6—Cliff Williams, Meridan, Miss.
District 7—P. L. Prentis, 116 N. Dearborn St., Chicago, Ill.
District 8—C. C. Kavanaugh, Little Rock, Ark.
District 9—James O'Riley, 406 Metropolitan Life Bldg., Minneapolis, Minn.
District 10—A. L. Barkman, Kansas City, Kans.
District 11—H. W. Lewis, Smithville, Texas.
District 12—W. T. Boyce, Claus Spreckles Bldg., San Francisco, Cal.
District 13—E. C. Snyder, First Ave. and Main St., Seattle, Wash.

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EQUIPMENT
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Clark Equipment Company
Buchanan - - Michigan
Clark Equipment is found only on good motor trucks

Pneumatic Tires on Trucks*

By B. B. BACHMAN

At the annual meeting of the society in 1913 I presented a paper on this subject and covered the matter in a more or less general fashion. Since that time considerable progress has been made in truck construction and a very great advance in pneumatic tires due to the appearance of the cord tire, whereas at the earlier date the fabric tire was used almost exclusively. The cord tire, permitting the construction of very large sizes with corresponding carrying capacities, has made it possible to use the pneumatic tire on trucks up to 3-tons capacity, and in some cases even beyond.

The most pertinent questions that arise in connection with determining the feasibility of the use of pneumatic tires are probably these:

(1) On what sizes of truck can they be used?
(2) In what class of service?
(3) On what kinds of road?
(4) What advantages are obtained?
(5) What disadvantages become evident?
(6) Will it be necessary to radically modify truck construction to use pneumatic tires most economically?

On the smaller-sized vehicles in the delivery field, there is hardly room for discussion as to the desirability and even necessity of pneumatic tires, as the speeds are high and construction follows closely on passenger vehicle lines. If these cars were made rugged enough to operate on solid tires, it would only require the increasing of the capacity of the spring equipment to make them suitable for possibly double their present ratings.

In the 2000- to 3000-lb. class, it is my opinion that except for limiting factors which will be covered later, all vehicles would operate more economically and satisfactorily on pneumatic equipment. The reason for this opinion is that on this size of vehicle the tire equipment does not become so expensive in initial installation as in larger sizes, and it is easier to realize on the advantages of increased speed, etc., without attendant difficulties.

Vehicles in the 2- to 2½-ton class are, I believe, likely to follow the last class, but to do so it is my belief that a different theory of design will have to be followed. Generally speaking, the cars in this class are too heavy in proportion to their capacity. This means that to carry the unnecessary burden caused by solid tire construction, excessively large and consequently expensive tire equipments must be used. It is only natural, therefore, that when the customer is faced with an initial equipment expense of 100 to 200 per cent. greater than for solid tires there is considerable hesitation about going into the proposition.

For the 3- to 3½- and 5-ton classes the foregoing remarks apply with possibly greater force. Also the utility of this equipment will probably depend on the future development of long distance truck haulage.

During the conditions existing for the last eighteen months in the congestion of railroads and terminals, etc., the use of large trucks for long distance hauling has come into considerable prominence. Under these extraordinary conditions many considerations which would normally have to be reckoned with were left out, due to the absolute necessity of utilizing every available means of transportation.

The increase in operating speed demanded by these conditions to obtain favorable results on these larger sizes has undoubtedly been followed by high mechanical depreciation on the part of the car and rapid disintegration of road surfaces. It is only natural, therefore, that the pneumatic tire was resorted to as a means of alleviating both these conditions, and undoubtedly results obtained were in many cases successful.

The question still remains to be answered, however, as to what the future will show as to the radius in which truck transportation can compete with various other forms and what size of unit will be most satisfactory. These questions hardly have a proper place in this discussion and are mentioned only to indicate that they exist and will have a bearing on our present subject.

To sum up then, it seems that for vehicles up to 1500-lb. capacity inclusive, pneumatic tires should be used, except under very rare conditions. Vehicles of 2000- to 3000-lb. capacity should be rapidly changed to pneumatic equipment in the large majority of cases, due to the appearance of the cord tire. A considerable percentage of 2- to 2½-ton vehicles will probably be placed on pneumatic equipment when the subject has been more clearly demonstrated to the public and after design changes which may be found necessary have been made. On the larger vehicles, it is my personal belief that a great deal of work must be done on a complex subject involving transportation problems, road construction, vehicle construction as to chassis, power plants and wheels, and also with the tires themselves, and rim equipment, before any definite prediction can be made.

The type of service in which pneumatic equipment should be used will cover, first of all, light delivery service of all kinds, for it is in this field that the small car up to 2000-lb. capacity is used.

In the sizes embracing the 3000-lb. and 2- and 2½-ton classes, the conditions where materials are fragile or where delivery conditions require long runs with frequent stops, are the places where the best showing has been made. Typical instances of this kind are delivery of foodstuffs in suburban territories and the recent development of the parcel post system in hauling farm products into the market.

With the larger size trucks the only place, it would seem, for the use of pneumatic tires is in that class of service covering long hauls, where speed requirements are high. One reason for making this statement is that with these larger size vehicles the loss in time due to improper handling facilities at terminals is so great that, where hauls are of normal length, more can be gained in speeding up the handling than by increasing the car speed.

A limiting factor to all of the preceding statements is to be found in the character of roads on which pneumatic equipment is operated. When vehicles are operated in part or entirely over roads which are littered with scrap metals, glass, etc., as is the case in certain kinds of work, the pneumatic tire will not have a fair opportunity to demonstrate in a satisfactory manner.

Advantages of Pneumatic Tires

The advantages claimed for the pneumatic tire are numerous. Some of these claims are so obviously correct as to need practically no discussion; others are open to considerable question. Also, as with every matter of this sort, the answer is not to be obtained from any one factor in the problem, but after the bearing which each factor has upon all the others has been given consideration.

The claims of advantage which are made may be listed as follows:

(1) Reduction in mechanical repairs.
(2) Increase in permissible speed.
(3) Decrease in gasoline consumption.
(4) Decrease in oil consumption.
(5) Less fatigue for men.
(6) Lessened depreciation of roads.
(7) Greater tractive ability.

The reduction of mechanical troubles can be accepted as a fact almost without comment. One point to be considered, however, is that while the net trouble is reduced, it is apt to change in character. With solid tire equipment, due to the shocks on the portions of the chassis which are not spring borne, the greater amount of difficulty is caused by the wear and looseness developed by this action. The small amount of resiliency in the wheels causes sharp blows to rack and twist the chassis structure, whereas the pneumatic tire absorbs a larger proportion of these shocks, and thus reinforces the spring action in relieving the chassis. There is, however, a reverse side to this, caused by the greater speeds which in spite of the generally larger sized wheels result in higher engine speeds. This sets up mechanical vibrations, which, in conjunction with other troubles engendered by high engine speeds, raises the proportion of trouble in this part of the mechanism. However, as stated before, the total amount of trouble is decreased, and this

*Extracts of paper presented at the recent Motor Truck Meeting of the Society of Automotive Engineers, in New York City.

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OF N. Y.

Chicopee Falls, Mass.

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(7) Greater tractive ability.

The reduction of mechanical troubles can be accepted as a fact almost without comment. One point to be considered, however, is that while the net trouble is reduced, it is apt to change in character. With solid tire equipment, due to the shocks on the portions of the chassis which are not spring borne, the greater amount of difficulty is caused by the wear and looseness developed by this action. The small amount of resiliency in the wheels causes sharp blows to rack and twist the chassis structure, whereas the pneumatic tire absorbs a larger proportion of these shocks, and thus reinforces the spring action in relieving the chassis. There is, however, a reverse side to this, caused by the greater speeds which in spite of the generally larger sized wheels result in higher engine speeds. This sets up mechanical vibrations, which, in conjunction with other troubles engendered by high engine speeds, raises the proportion of trouble in this part of the mechanism. However, as stated before, the total amount of trouble is decreased, and this

*Extracts of paper presented at the recent Motor Truck Meeting of the Society of Automotive Engineers, in New York City.

FISK SOLID TIRES

—dependable

TRUCKS can't afford to lose time.

Minutes count in the delivery of merchandise.

Good tires prevent delays.

Dependable tires are built to wear, and meet the rugged conditions encountered in actual use.

Fisk Solids are dependable—you buy them with confident knowledge that you are making a wise and permanent investment.

THE FISK RUBBER CO.
OF N. Y.

Chicopee Falls, Mass.

becomes more apparent when placed in proportion with the car mileage.

This is illustrated to some extent by the experience on a group of 1½- to 2-ton cars numbering about sixty, which are being operated on long distance transfer work. The mileage is running between 50,000 and 60,000 miles per year. The distances covered by each car range from 130 to 205 miles per day, the high daily mileage being made possible by properly regulating shifts for the men. Unfortunately there is no parallel service on solid tires to compare with, but it is the opinion of competent observers that the repair cost for these cars is 50 per cent. of the probable cost on solid tires, and it is extremely doubtful if the work could be performed at all with solid tires on anywhere near the present schedule.

Reports from these cars indicate an extremely small amount of mechanical trouble in the axles and chassis. It is estimated that 75 per cent. of the repair work is on the power plant, and a considerable, if not the greater, proportion of this is due to the fact that the increase in speeds has not been accompanied by more care in following up lubrication, etc.

To anyone who has attempted to drive a vehicle on solid tires on any but roads in absolutely perfect condition, and particularly if the car was not loaded to a point where the springs were operating to their full extent, the limitations on speed are painfully apparent. The writer has driven a 3-ton truck on solid tires 165 miles at an average of 17 m.p.h., and as a result is prepared to discourage anyone from doing likewise with the thought in mind that the experience is pleasant. On pneumatic tires this would not be at all difficult. This ability to increase the speed of the vehicle materially increases the distances which can be covered, and is one of the most important advantages to be gained. As pointed out before, however, the gain will be limited if the proportion of idle time at terminals and delivery points is high, and this is one of the, at present, undetermined factors in predicting the degree of success which will follow the use of pneumatic tires on larger sizes of vehicles.

The question of relative gasoline consumption is not so easy to dispose of. Many claims are made as to increase in economy effected by use of pneumatic tires. Unfortunately, the supporting evidence in many cases is, to say the least, incomplete. Comparisons are made in some instances between vehicles of different makes, in others between vehicles of the same make but operating under dissimilar conditions, and so on. Anyone who has attempted to collect accurate data on this subject can appreciate the large number of variables which can influence the results and will understand how hard it is to assign a value to each of these variables.

On the group of vehicles mentioned above the average of gas consumption for all the cars is very close to 35 gross ton-miles per gal. On this type of car with solid tires, 30 to 32 gross ton-miles per gal. is considered average performance. These figures are not directly comparable, however, for the reasons enumerated.

I have made some tests using the same car and nearly the same loads over a route 272 miles, with average road conditions as to surface and gradients. The solid tires were 34 in. in diameter, and the axle gear reduction was such as to give 69.3 r.p.m. of the engine per m.p.h. of the car. The pneumatic tires were 38 in. in diameter and gave 62.7 r.p.m. per m.p.h. Three series of tests were made, one with solid tires, one with the pneumatics on the same axle reduction, and the third with the axle reduction altered to compensate for increased tire size.

Runs were made with diffffferent loads; in the case of the solid tire one run was made with a considerable overload, which was not duplicated on the pneumatic tires. The results obtained are tabulated below:

Test number	Weight empty, lb.	Load, lb.	Total weight, lb.	Ton-miles Per gal.	Total time in high gear, per cent.
1*	4,500	525	5,025	30.33	89.1
2*	4,500	2,350	6,850	32.45	77.7
3*	4,500	4,175	8,675	36.35	62.7
4*	4,500	5,900	10,400	42.00	57.1
5†	4,500	680	5,180	28.20	81.3
6†	4,500	2,000	6,500	32.10	74.6
7†	4,500	3,580	8,080	31.96	62.1
8‡	4,500	550	5,050	24.40	88.2
9‡	4,500	3,480	7,980	27.40	63.0

*Solid tires.
†Pneumatic tires and the same axle reduction.
‡Pneumatic tires and a changed axle reduction to compensate for the greater wheel size.

These tests were made as carefully as possible and are, to say the least, disconcerting in the results shown. It is possible, and in fact very probable, that these results are due to the form of the tires, which were not of the conventional cross-section and were designed to operate at considerably lower inflation pressures than normal.

General observations lead me to believe that the performance with regard to gasoline consumption will vary according to the road conditions. On very good roads there will be little or no difference, while on bumpy roads the pneumatic tire will show up the better.

With regard to the claim for decreased oil consumption I can see no good reason for any change in this particular. If there is any difference I should think it would be to show a higher consumption for pneumatic tires, because on the whole the engine speeds will be higher, and as the wheel diameters are greater the engine will be required to develop high average pressures, that is, it will be operating at a greater throttle opening more of the time.

The decrease in strain and the resultant lessened fatigue of the driver is a very important advantage. It is difficult to assign a definite relative value to this feature, but it needs little discussion to realize that the efficiency of the machine is dependent on the efficiency of the operator, and anything which favorably affects the latter will be reflected in improvement in the former.

The question of the effect of heavy truck traffic on roads is one which is occupying a prominent place in the thoughts of those charged with their construction and maintenance. The claim is made that the pneumatic tire lessens the strain on roads caused by the larger sizes of trucks. On what this claim is based it is hard to say. There has not, up to the present time, been sufficient experience with pneumatic equipment on trucks of 3-tons capacity and over to give data on which to base an opinion.

Observations made on the highways traversed by heavy truck traffic during the last eighteen months indicate that a large amount of the trouble was due to the failure, not of the surface, but of the foundations, and while it may be argued that this was in part due to shocks and vibrations, it is my opinion that the real reason was simply overload. Given a good road as to foundation and surface, and trucks operated at reasonable speed with respect to their size, and I do not believe that any great difference in road depreciation will be found.

One very great advantage of the pneumatic tire is the greater adhesion possible, particularly with the types of so-called non-skid treads which have been developed. This feature has shown itself to be of great value, especially during the severe weather of last winter, when pneumatic tired trucks repeatedly demonstrated their ability to keep going, while solid tire equipment was in continual difficulty.

Objections to Pneumatic Tires

The objections to pneumatic tires are not so numerous but need careful consideration lest we be carried away with the idea that their use offers a solution for all troubles with no problems of their own needing attention. These objections are in my opinion:

(1) High initial cost compared with solid tires.
(2) The need of carrying emergency equipment.
(3) The difficulty attendant on making road changes due to weight and high inflation pressures required.
(4) Reduction of the high gear ability and limitation of the total ability due to larger diameter of wheels.
(5) Limitations imposed on the size of brakes due to the small size of wheels.

Referring to the table: On the 1-ton size only one extra tire is figured in, as the front and rear ones are the same; for the other sizes two extra tires are figured. It is possible by increasing the size of the front tires on the 1¼- to 1½-

Sewell Cushion Wheels

OF INTEREST TO TRUCK MANUFACTURERS AND DEALERS

For years solid tires have been used as standard equipment by all motor truck manufacturers for trucks of 1½ ton capacity and over.

The war has brought about a complete change in conditions and has advanced transportation methods ten years or more.

Noticeable among these changes is the demand of customers for additional resiliency, increased speed and more protection to their motor trucks against damage from vibration.

Sewell Cushion Wheels have proven their merits to hundreds of large national concerns during the past eleven years that they have been on the market.

Sewell Cushion Wheels are built to fit the manufacturers' hubs, and are equipped with standard S.A.E. bands which take the same size of solid tire. As a result, they can be very easily installed either at the factory or on trucks sold off the dealer's floor, with no installation expense to the manufacturer or truck dealer.

Sewell Wheels meet the requirements and demand for resiliency, and give the necessary protection.

OVER 25,000 SEWELL WHEELS NOW IN USE

Sewell wheels will be on exhibition at the Automobile Shows in Boston and Philadelphia

A folder explaining the construction of Sewell wheels will be mailed on request

BRANCHES:

Baltimore, Md.
Boston, Mass.
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Jacksonville, Fla.
Kansas City, Mo.
Los Angeles, Cal.

BRANCHES:

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Milwaukee, Wis.
Minneapolis, Minn.
Newark, N. J.
New Orleans, La.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Rochester, N. Y.
San Francisco, Cal.
Seattle, Wash.
Springfield, Mass.
St. Louis, Mo.

Sewell Cushion Wheel Company

Main Office and Factory: Detroit, Michigan

ton class to have all tires alike, and this would in all probability be desirable.

Based on these figures, it will be seen that a material increase in tire mileage must be obtained to bring the cost per mile down to within a reasonable comparison with solid tires. Fortunately, this seems perfectly possible, at least up to 2-tons capacity. On the group of cars which has been used before in this article for illustration, the grand average of reported mileage to date is 14,000 miles. One make of tire has averaged 19,000 miles, and of all the tires none has given less than 6000 or 7000 miles.

This objection then resolves itself into a proposition of increasing the difficulty of getting the truck owner interested on account of the greater investment. To offset this, experience on cars up to 2-tons capacity at least, indicates that the longer tire life obtained, together with the compensating factors outlined above under the head of advantages, will pay a reasonable return on this increased investment.

The need for emergency equipment is a distinct handicap, not only from the standpoint of initial expense, but because of the difficulty in providing suitable place for carrying these large sized tires so as to be accessible and yet not encroach seriously on the cargo space or interfere with the operator when getting into the truck.

The question of road changes for punctures, etc., is a very serious item. while these troubles are guarded against in the tire construction and are reduced to a minimum, they cannot be eliminated and the penalty incurred by running on a flat tire is too great to be considered. The two bad features in this proposition are the weight of these tires and rims, and the high inflation pressures required.

The weights are roughly as follows for an inflated tire and demountable rim: 38 by 7-in., 152 lb.; 40 by 8-in., 213 lb.; 44 by 10-in., 400 lb. These figures represent weights that require quite a bit of handling.

Inflation pressures recommended are: 5-in. section, 80 lb.; 6-in., 90 lb.; 7-in., 100 lb.; 8-in., 110 lb.; 9-in., 120 lb.; 10-in., 130 lb., and 12-in., 140 lb. It is impracticable to consider hand pumping for any but the 5-in. size, and a mechanical pump to do the job is quite a piece of apparatus, and to be installed correctly adds another considerable item of expense which must be taken into consideration.

By referring to the table, it will be seen that the driving wheel diameters are increased as follows:

Capacity, tons	Old diam., in.	New diam., in.	Increase in diam., per cent.
1	 34	35	3
1¼ to 1½	 34	36	6
2 to 2½	 36	40	11
3 to 3½	 36	44	22½
5	 36	44	22½

On the smaller sizes the change is not so great and will probably work no material hardship, except in cases where the brake equipment is on the transmission. With the larger sizes the difference is so great as to make it extremely doubtful whether there is sufficient flexibility in any well-designed truck to permit successful application.

The larger sections used in these tires, together with the space taken up by the demountable rim, leave a very small wheel diameter remaining, and this imposes severe limitations on the size of brake equipment and decreases the ability of the brakes at the same time. This is a very important matter, on account of the fact that the greater speeds put considerably heavier duty on the braking systems.

The heavy-duty pneumatic tires, particularly in the larger sizes, have come into prominence in the last few years when engineers were so completely occupied as to leave little time for the thorough investigation of the subject to determine what effect their use would have on future design. That there will be need of a considerable change in design with respect to some particulars seems very evident.

The increase in speed carries with it a demand for more efficient brake equipment. Whether the present style of direct-acting brake can be developed further to do the work on the larger trucks is a question which will have to be considered. Inasmuch as air pressure will be needed to inflate the tires, calling for an efficient air compressor, it may be found feasible to add the other elements necessary to provide for the use of air-brakes.

Trucks as built at present have been developed for solid tires. The factors of safety in the load-carrying elements have been made sufficiently great to provide for the shock incident to their use. The gear ratios in axles and transmissions have been designed on the basis of the wheel diameters in common use. The thrust capacities of the bearings and the torsional strengths of axle, transmission and propeller shafts have also been calculated on these wheel diameters. Increasing the wheel diameters has created an entirely new set of conditions which must be investigated before the answer can be safely stated.

This does not mean that pneumatic tires cannot be used successfully with trucks as they are built today. They not only can, but are being so operated. It does mean, however, that particularly on the larger sizes, the truck engineer must recognize the new conditions which confront him and must prepare himself to meet them by making careful investigations on the subject and learning the relative importance of the items herein suggested, and possibly others which have been neglected.

Table Showing Increased Cost of Pneumatics Over Solids

Truck capacity, tons	Solid tires front, in.	Solid tires rear, in.	Pneumatic tires front, in.	Pneumatic tires rear, in.	Inc. cost pneumatic tires over solid, per cent.	Inc. cost pneumatic over solid including ex. tires, per cent.
1	34 x 3½	34 x 4	35 x 5	35 x 5	80	125
1¼ to 1½	34 x 3½	34 x 5	35 x 5	36 x 6	93	184
1¼ to 1½	36 x 3½	36 x 5	35 x 5	36 x 6	77	165
2 to 2½	36 x 4	36 x 7	36 x 6	40 x 8	110	216
3 to 3½	36 x 5	36 x 5 dual	36 x 6	44 x 10	87	180
5	36 x 6	36 x 6 dual	38 x 7	44 x 10	60	140

Wellman-Seaver-Morgan Elects Officers

CLEVELAND, OHIO, Feb. 20.—At the annual meeting of the stockholders of the Wellman-Seaver-Morgan Company at the general offices of the company in Cleveland, on February 18, the retiring board of directors was re-elected.

The board consists of: Edwin S. Church, F. E. Borton, W. H. Cowell, F. B. Richards, S. T. Wellman, E. H. Whitlock, of Cleveland; S. H. Pitkin, Francis Seiberling, and F. A. Seiberling, of Akron.

At the annual meeting of the board of directors called immediately after the meeting of the stockholders, the following officers were elected:

Edwin S. Church, president and general manager; S. H. Pitkin, vice-president; Geo. W. Burrell, second vice-president; W. H. Cowell, secretary and treasurer.

Amazon Shows Big 1918 Business

AKRON, OHIO, Feb. 19.—At the annual stockholders' meeting of the Amazon Rubber Co., held at the factory recently, a report was given showing that the company's business during 1918 showed an increase of 85 per cent. over 1917. The company anticipates another increase of at least 50 per cent. this year.

An extra dividend of 12½ per cent. was declared, payable on common stock.

Officers re-elected for the year are Albert Kroehle, president; J. A. Burger, vice-president; L. J. Schott, treasurer and general manager, and L. S. Smith, secretary and general superintendent.

Star Tire Company Enlarges Its Akron Factory

Contracts have been let by the Star Rubber Company for the erection and equipment of an addition to its plant at an estimated cost of more than $200,000.

It is expected that the plant will be ready for occupancy by May 1. Mill room capacity is to be increased and storage space for raw material enlarged.

GUARANTY PLAN BANKING

EVERY progressive truck dealer maintains two banking connections.

One of these is properly with his local bank for current deposits and expenses.

The other should be with the strongest banking institution specializing in the discount of automobile paper.

A connection with such an institution gives the dealer a certainty of being able to finance his receivables irrespective of local money-market conditions.

Continental Guaranty Corporation, known until April 15th as Guaranty Securities Corporation, has the largest resources of any banking institution in the world devoting its exclusive attention to automobile financing.

Resources of over $10,000,000.00, a strong organization, a clean-cut, four-square policy, and an abiding faith in the automobile industry have put the institution in the foremost place.

We solicit inquiries from responsible, well-rated merchants of trucks, who would like to discuss the matter of opening an account with us. Your inquiry places you under no obligation.

Continental Guaranty Corporation

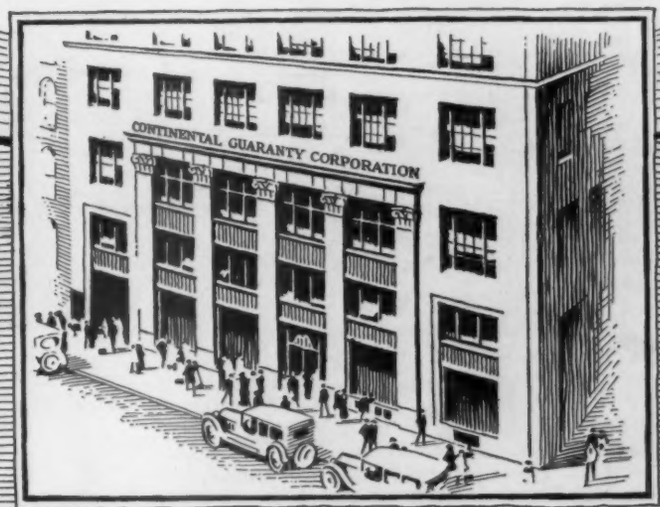
Continental Guaranty Building New York City

San Francisco Montreal

Affiliated with Guaranty Banking Corporation

Continental and Commercial Bank Building, Chicago, Illinois

110,000 trucks and automobiles (worth over $100,000,000) financed up to Nov. 30, 1918



The Rural Express

(*Continued from page 14*)

We met the truck just outside of Bayshore on our way back. Further conversation with the produce dealer revealed the information that he believed that the Rural Motor Express would eventually build up a big business and that the company would extend its service at least as far as East Hampton, 112 miles distant from New York. Having no competition, the produce dealer welcomed the relief afforded by the store door delivery truck service.

Converts Old Time Shipper

Another convert to the Rural Motor Express was found shortly after leaving Sayville, where we picked up a dozen kegs of scallops. The agent here, who has converted an old stable into a warehouse, informed the driver that there were 10 barrels of oysters to be picked up at the shore and, leading the way in his "Henry," he piloted us to a concern that has been in the oyster business for 50 years. While the driver and agent were loading, the writer talked with the owner who said among other things, that for 50 years his family (it is a close corporation) had always relied on the water and railroads to get its oysters to market. "But," he added, "if this here auter," he really pronounced it that way, "can keep up its good work, I am glad to say I'm done with the railroad, and say, young feller," speaking to the driver, "be sure and get around here early on Wednesday as I've got a big load going to New York for boat to Bridgeport and don't want to miss the boat." This suggested to the writer's mind a new angle of the Rural Motor Express, and it is that the common carriers are going to find it a tough job winning back any custom lost to the truck which is educating old shippers like this oyster man to the importance of the time factor in transportation.

Takes on $1000 Worth of Scallops

It was dark when we again struck the main highway and lighting the acetylene headlights after a struggle with a refractory valve of the gas tank, we pushed on to Bayshore where a load of scallops and fish was awaiting us, as was the agent. Backing up to the platform, in the dark, the work of loading began. "Be careful not to set her on fire, Harry," remarked the agent to the driver, "for if you burn up this cargo it will set Warden back just 1000 bones on the scallops alone. And here's a few live ones for your family, Harry." The speaker then passed over a large mess of live fish.

Driving a motor truck even with long hours of work has its compensations, at least in this instance. It was the last pick-up and our cargo was running close to 4 tons. We made a stop for supper and the writer made the mistake of inviting the driver to dine with him. Hoover must have been acquainted with truck drivers when he regulated the menus. To this day I have not been able to determine whether the driver—he was stout—had been on a diet and fell from grace or he believed that politeness required him strain the cash register.

Railroad Waking up

Before we left Bayshore the agent put in an appearance—the driver was still eating—and remarked that the express company was going to put a truck in service. "Guess, we've kinder waked them up, but they won't get the business," he remarked. It developed that the Rural Motor Express had won the approval of the fishermen, the agent remarking that it had eliminated the greatest trouble, that of tampering with the goods in shipment. "Very often the weights of the shipper and those of the consignee would not agree," said the agent. "The fish would kinder shrink, not a pound or two but several pounds. We proved that somebody was monkeying with the shipments by sealing in such a way that any monkeying could be detected and without their knowing they were breaking the seal. It was hard to place the blame and harder to get an adjustment with the railroad. Now with the truck there is but one man handling the fish between here and the consignee, so it's easy to trace any loss there might be."

Will Cover Entire Island

The Long Island Rural Motor Express will eventually cover practically the entire island. The present route to Patchogue is to be extended to East Hampton and will afford shipping facilities to the great duck industry centered in and around the Moriches, a business promising big returns to the Rural Motor Express. Two other routes will include the north shore, passing through Flushing, Roslyn, Glen Cove, Oyster Bay, Huntington and Northport via Mineola, Southampton, Port Jefferson, Riverhead, and intermediate towns via the Mineola turnpike.

The plans of the company provide for warehouses or terminals to which the shipments will be brought. Trucks will serve as feeders to these stations, At New York City, the headquarters of the company, small trucks are utilized to pick-up or collect and the loads are transferred in a terminal at Long Island City to the 5-ton trucks. Whenever a capacity load is obtained, the big truck is sent direct to the shipper.

Will Develop Rural Routes

A campaign has been mapped out and work started on the real Rural Motor Express principle, that of transporting the products of the farm to the city. Certain sections of Long Island produce huge quantities of perishable food, garden truck, vegetables, ducks, chickens, eggs, etc., the greater part of which is shipped to New York. Mr. Warden is so confident that big business will develop that he has placed a repeat order for trucks with the Colt-Stratton Company, distributors in New York for the Day-Elder line. At present there are two 5-ton Pierce-Arrows and four Day-Elder trucks in service. Five 5-ton Day-Elders are being equipped with Rural Express bodies and doubtless will have been placed in service by the time this article appears in print. The additional order will bring the total of trucks up to 19.

Reverting to the subject of exploiting the motor truck in Rural Motor Express service it will be found that the successful salesman in this field should have an intimate knowledge of its requirements, particularly in the territory to be served. It does not mean that the dealer should have a complete knowledge of the common carriers, road conditions, industries, etc., in his territory, although such data will be found to be invaluable, but he should be able to analyze his territory as to the opportunities for Rural Motor Express lines and lay out a number of tentative routes for the prospect to investigate.

The Consignee's Name Now Unnecessary on Export Bills of Lading

The War Trade Board, in a recent announcement, advises shippers that it will be no longer necessary for steamship companies that are carrying exports to Latin America and also to the Far East to require shippers to put on the bill of lading the name of the consignee. The War Trade Board has been advised that this practice is causing embarrassment to shippers who have consigned goods to firms in foreign countries, who have, subsequent to the dispatch of the shipping documents, gotten into difficulties, as the Government of destination has refused to deliver goods to any but the notified party.

This ruling in no way affects the requirements which call for the consignee or purchaser abroad being specified on the application for export license, the export license itself, and the export declaration. This notice refers merely to the ocean bills of lading, covering shipments properly consigned to "order," and has no bearing as to those shipments which under certain regulations of the War Trade Board, must be consigned directly to a named consignee, or as to those shipments which are consigned direct to the purchaser abroad.

Monthly Transportation Service Between Seattle and Singapore

New York agents of Ocean Transport Company, Limited, of Kobe, Japan, announced that a regular monthly service is soon to be inaugurated between Seattle and Singapore, with calls at Manila, Hongkong, Kobe and Yokohama. The first sailing from Singapore will be some time in March.

POLACK
TRUCK TIRES

1899 1919

THE TRUCK USER'S ASSURANCE

Whether investing in Government Bonds or investing in Truck Tires, nothing counts so much as the *Assurance* of buying SOUND VALUE.

Twenty years the UNIVERSAL STANDARD of truck tire construction;

Twenty years the ONLY truck tire to remain a PERMANENT STANDARD while others experimented, only to ultimately adopt the POLACK;

Twenty years SPECIALIZATION with a STANDARD PRODUCT resulting in an advanced truck tire of the highest quality to be found anywhere;

Such is the complete *Assurance* of securing in POLACK Truck Tires SOUND, MAXIMUM VALUE.

DEALERS—With the enormous increase in Motor Trucks that will pass the three-quarter-million mark in 1919, you cannot as a progressive dealer ignore the big possibilities for profit and prestige in a Quality Truck Tire like the POLACK

Be a POLACK Dealer—"Increase your prestige while adding to your profit."

Write us for details of attractive Dealer Proposition in open territory.

POLACK TYRE & RUBBER CO.
1876 Broadway
New York
Branches in Leading Cities

SINCE 1899 WORLD'S STANDARD

Twelve Million Pounds of Wool a Year Hauled at Less-Than-Freight Charges

Boston Trucking Concern Establishes This Record in Handling Material for American Woolen Company. Time Saved in Making Deliveries Varied From Two Days to a Week

By SAMUEL SAYWARD

HAULING a million pounds of raw wool a month for more than a year, at a rate cheaper than that which would be given for shipping by freight is a noteworthy accomplishment. A Boston trucking concern performed this feat, however, and made money by the transaction.

It was not originally planned that this trucking company should handle this great volume of raw wool. An emergency arose, the truck and trailer came to the rescue and the result was the drawing up of a contract that probably moved the largest amount of raw wool in the shortest space of time ever covered by a single contract.

When Uncle Sam began to gather his armies preparatory to sending them to a glorious victory in Europe, it was necessary to clothe them, and the mills of the country were given large contracts. At about the same time the railroads of New England were running short of coal, short of cars, short of employees. There were temporary embargoes, tie-ups and other annoyances to shippers. Then there was difficulty in getting raw materials and many other unusual conditions for the manufacturer and the shipper to face.

The American Woolen Co., which operates more than fifty mills in various parts of New England and is the largest woolen manufacturing company in the world, managed to get its raw wool to Boston, but to move it from Boston to its mills soon became a serious problem. Railroad transportation was uncertain. Express conditions were better, but were more or less uncertain, and the rates for such bulky material as raw wool were prohibitive.

When the emergency arose, Youlden, Smith & Hopkins, Boston truckmen, were consulted, and agreed to take an emergency shipment from Boston warehouses to the mills in Lawrence, Mass., a distance of 30 miles over the road and 27 miles by rail. With a five-ton Pierce-Arrow truck and a five-ton Troy trailer, a load of 12,000 lb., or six tons, of raw wool was possible, for, owing to its bulky nature, it was impossible to pile the load higher and safely pass along the highways and beneath the trolley wires. It was also arranged to have a return load of manufactured goods brought to Boston.

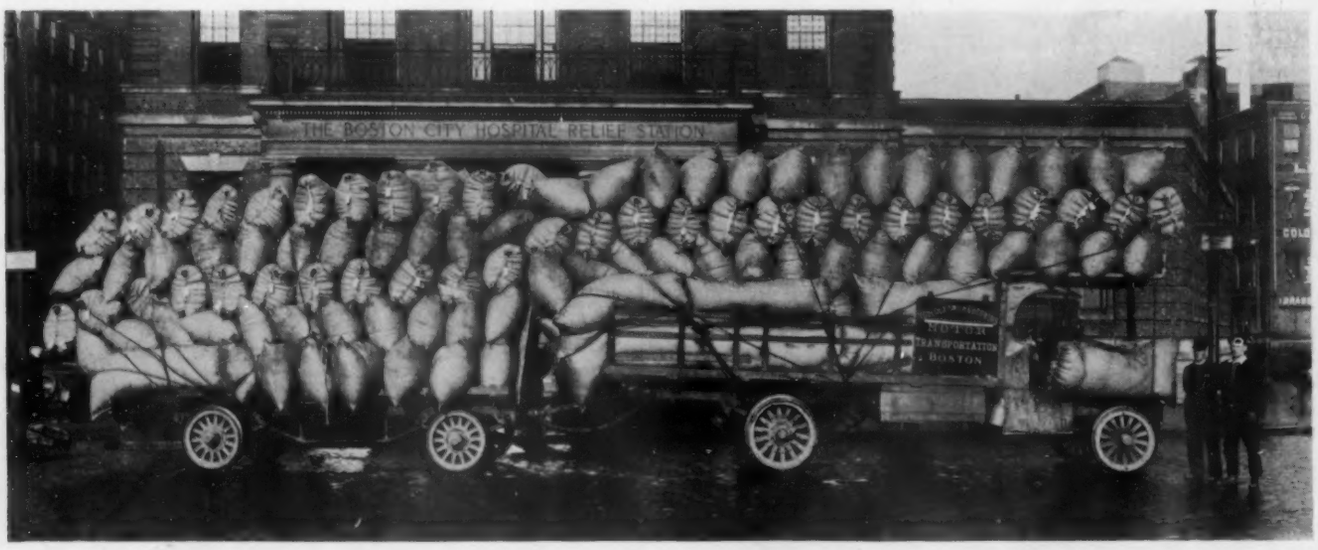
So quickly was the trip made, so easily was the wool handled and, when the cost of the trip was figured, so low was the figure, that it was immediately decided to transport the greater part of the raw material in this manner.

The trips were not all made to Lawrence. They were made to all parts of New England. The raw material was carried to the mills, and finished products or goods in process were carried on the return trips. The Pierce-Arrow company designed a special frame with extension over the operator's cab which permitted an additional ten bags or 1000 lb. to be added to the load without breaking down the cab through constant loading. This brought the total weight of the load on truck and trailer up to 13,000 lb. This little extension meant an additional profit of several dollars for each trip.

To keep this huge amount of wool in motion, there were often as many as twenty truck-and-trailer loads on the road at one time and the average trip was 30 miles.

Transportation Costs Less Than Freight Rates

The cost of the work is not announced by either the trucking firm or by the American Woolen Company. But it is announced that the carrying of this wool, and the handling of the return loads, miscellaneous in character, varying from empty bobbin cases, machinery, cloth in process and finished products to almost anything connected with the textile business, was carried out at a cost less than the actual freight rate for handling the materials between the



Thirteen Thousand Pounds of Raw Wool Are Represented in This Truck-and-Trailer Load

The extension frame above the operator's cab holds a thousand pounds, or ten bags. The picture was taken in front of the Boston Relief Hospital, a block in width, between Canal and North Washington Streets, Boston. Youlden, Smith & Hopkins, Boston truckmen, moved a million pounds of raw wool a month in this manner.

HOFFMAN PROCESS

Science Dictates the Making of Hoover Steel Balls

Science has reduced the manufacture of steel balls to exactitudes.

The raw steel must possess certain qualities, its composition must grade up to precise standards.

There can be no compromise.

Science guarantees the quality of the steel that is fabricated into Hoover Steel Balls. Guesswork is eliminated, standards are fixed.

To excel in and to permit no limit of quality, there are established and maintained complete research and control laboratories as an integral part of the great Hoover plant.

Neither the most trivial effort is ignored nor the expenditure of vast sums of money avoided to keep Hoover Steel Balls in their coveted position of superiority.

Before acceptance is made each lot of steel must pass the rigid tests of the Hoover laboratories. The commercial requirements of steel balls are being elevated constantly, therefore the importance of scientific manufacture is obvious.

Hoffman Process

The Hoover Steel Ball Company is one of three ball manufactories in the world permitted to use the Hoffman Process. By this advanced method are made the most perfectly finished steel balls obtainable. It insures greatest uniformity of the highest finish.

The great resources of this company have made possible its wonderful advancement, and the never ceasing determination to keep the lead is bound to constantly add to the large number of users of Hoover Steel Balls.

Extensive research work is conducted in the Hoover laboratories to guard the established high quality of Hoover Steel Balls. Here is shown the physical laboratory.

Hoover Steel Ball Company
Ann Arbor, Michigan

HOOVER
STEEL BALLS

points of origin and destination would have been.

That saving, in the handling of more than a million pounds of raw wool alone, would amount to a handsome figure. But that is only a small portion of the actual saving made. In time, it saved from two days to a week in making deliveries and in saving time it meant a saving in the amount of materials which had to be on hand and in transit. It meant a never-ending supply of anything needed, at any time needed, thus increasing efficiency in all of the mills through the absence of delays in receiving goods or materials in process. It eliminated several handlings of the goods, saving the expense of extra crews of men to do this extra handling, for had it been shipped by freight it would have been loaded at the warehouses, hauled to the freight houses, unloaded from the teams, loaded on freight cars, unloaded at freight warehouses at destination, loaded upon teams again, and again unloaded at the mill doors. Instead, it was loaded on the trucks and trailers and delivered at the mill doors.

That represented the labor saving. In addition, it was not necessary to make out bills of lading and check them with the railroads, check them again at the mills and again at the destination freight offices. It was not necessary to employ tracers to see that the goods kept moving in transit and there were no claims to be made out and pursued for goods damaged in transit. Practically speaking, the goods were never out of the company's hands a minute. There was not a cent's worth lost through damage in transit. The crew on each truck-and-trailer outfit consisted of the chauffeur and one helper.

Inasmuch as the company made a saving in handling the goods by reducing the actual freight charges at the outset, it will not take a mathematician to figure out that this saving was but a small part of the actual saving made; a saving which included an item for larger stocks in transit to secure an uninterrupted flow of materials to and from the mills, a saving in labor, a saving in clerk hire and a tremendous saving in overhead charges.

Republic Dealers Meet at Factory

ALMA, MICH., Feb. 17.—A number of Republic truck distributors were recently called to the factory from different parts of the country for the purpose of getting the dealers' views regarding two new models which the Republic Truck Co. is putting on the market—Model 19 Republic "Invincible," with a capacity of 2-2½ tons and Model 20, Republic "Dreadnaught," of 3½ tons capacity. The meeting was an informal conference. It continued for three days and unique and interesting features of entertainment were included in the convention program.

The regular annual convention of Republic distributors and dealers will be called in Alma at a later date.

Metal and Rubber Markets

Talk of Lower Prices Gaining in Steel Trade

There is a unanimity of opinion in the steel trade that prices must come down. There is a question of just how much reduction will be made and how soon the reduction can be made. The whole question hinges on the present prices of foodstuffs and clothing, as the steel producers feel that it is unfair to reduce wages while prices of these commodities are so high.

At a recent meeting of the directors of the American Iron and Steel Institute, Judge Gary made the statement that, as far as he knew, prices on steel were being well maintained.

There has been considerable opposition to Secretary Redfield's plan for stabilizing the basic industries, since the producers feel that the steel industry, acting independently in the open market, has brought about considerable good in the way of readjustment to a peace basis.

Steel Products Prices

Per ton, Pittsburgh—			
Bessemer billets	$43 50	a	....
Open hearth	43 50	a	....
Forging billets	56 00	a	....
Sheet bars	47 00	a	....

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—			
Pittsburgh	$3 90	a	....
Philadelphia	3 14	a	....
Chicago	4 17	a	4 65
Galv. Sheets of Black Sheet Gauge—			
Pittsburgh	$6 05	a	....
Chicago	6 32	a	....
Tin—Mill Black Plate—			
Pittsburgh	$4 70	a	....

Tin Plate

Tin plate, prime, per base box.	$7 35	a	....
Tern plate, I. C.	7 40	a	....

Iron and Steel at Pittsburgh

Bessemer iron	$33 60	a	....
Bessemer steel, f.o.b. Pittsb'h.	43 50	a	....
Skelp, grooved steel	2 70	a	2 90
Skelp, sheared steel	3 00	a	3 25
Ferromanganese (70 per cent.)	190 00	a	200 00
Steel, melting scrap	16 00	a	....
Steel bars	2 70	a	....

COPPER.—There is little activity in the copper market, at present. Figures showing production of copper by some of the leading companies during the month of February indicated that the policy of curtailed output was being put into practice.

ALUMINUM.—In the absence of any announcement to the contrary it is assumed that open market conditions now obtain in aluminum. Current prices are from 31 to 33c.

TUNGSTEN.—There has been no change in the tungsten situation. None of the buyers have expressed any willingness to come into the market at any price whatsoever, and the market remains stagnant. The present situation has been aggravated by the arrival of more ores.

Other Metal Products

Further recessions have been recorded in this group. The following prices are current on brass and bronze items:

Sheet aluminum, 18 ga. & h'v'r.	$42 00	a	....
Copper sheets, hot rolled	24 50	a	....
Copper sheets, cold rolled	25 50	a	....
Copper bottoms	32 50	a	....
Seamless tubing, bronze	33 00	a	....
Cut lead sheets	8 00	a	....
Copper rods	21 50	a	....
Copper wire	19 75	a	....
High brass wire	20 50	a	....
High brass sheets	20 50	a	....
High brass rods	19 50	a	....
Low brass sheets	22 50	a	....
Low brass wire	22 50	a	....
Low brass rods	23 75	a	....
Brazed tubing, brass	31 50	a	....
Brazed tubing, bronze	36 00	a	....
Seamless tubing, brass	30 00	a	....
Seamless tubing, copper	31 00	a	....

Prices of Old Metals

Aluminum—	Buying		Selling	
Cast scrap	17½	a18	18½	a19
Sheet scrap	18½	a19	19½	a20
Clippings	20	a21	22	a22½
Copper—				
Heavy machinery comp.	13	a13½	14	a14½
Heavy and wire	12½	a13	13½	a14
Light and bottoms	11	a11¼	11½	a12
Heavy, cut & crucible	13½	a14	14½	a14¾
Brass, heavy	7	a 7½	8	a 8¼
Brass, light	6	a 6½	7	a 7½
No. 1 clean brass turn'gs.	6½	a 6¾	7	a 7¼
No. 1 comp. turnings	11	a11½	12	a12½
Lead, heavy	4¼	a 4⅜	4⅝	a 4⅞
Zinc scrap	3½	a 4	4¼	a 4½
Block tin, scrap	50	a53	55	a58

Increase in Rubber Imports

The crude rubber situation is becoming gradually easier from the standpoint of the manufacturer. The trade is proceeding on the theory that plenty of raw material will be available and it is believed that imports into the United States during March will make new records. Figures in February showed an increase over those of January.

Prices quoted March 4 were:

Para—Up-river, fine, per lb.	58½	a	..
Up-river, coarse	35	a	..
Island, fine	49½	a	..
Island, coarse	22½	a	..
Caucho, ball, upper	35	a	..
Caucho, ball, lower	..	a	..
Cameta	23	a	..
Plantation—First latex, pale cr.	55¼	a	..
Brown, crepe, thin, clean	49	a	50
Smoked, ribbed, sheets	54¼	a	..
Centrals—Corinto	37	a	39
Esmeralda	37	a	39
Guayule, wet	32	a	..
Guayule, washed and dried	42	a	..
Balata, sheets	90	a	..
Balata, block, Ciudad	..	a	75
Balata, block, Panama	55	a	60
Mexican—Scrap	39	a	..
Slab	32	a	..
African—Massai, red	55	a	..

SCRAP RUBBER.—The market is still devoid of interesting features, remaining dull and easy.

Tires—Automobile	3¼	a	..
Bicycles, pneumatic	3	a	..

balanced oversize

this is what it means

—not just an oversize motor or an oversize frame, but every part oversize to a certain definite scale—predetermined according to the proportion of the load it will be called upon to carry.

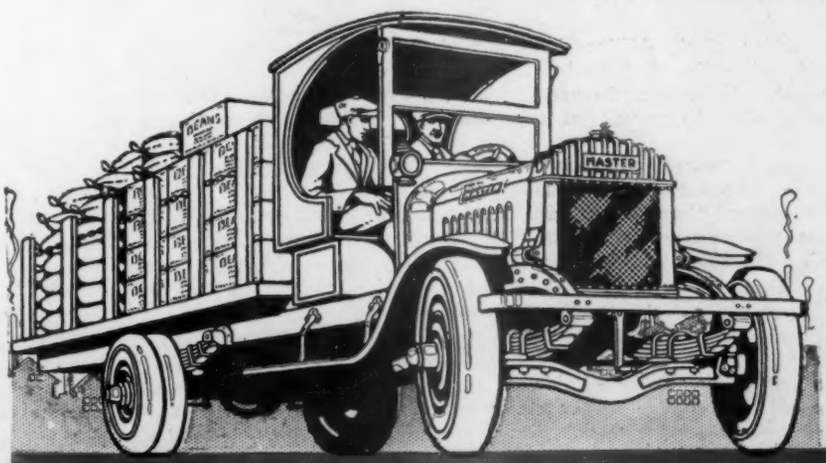
Each part balanced in strength, size and capacity to perform its job just as well—just as economically as the part next to it, to carry its part of the load—and not throw an extra strain on any other part.

This is the Master feature that sixteen years of successful truck-building experience has developed in Master trucks.

To carry the Master line is to carry the line that meets today's needs 100%. Eleven models in 5 sizes—1½ to 6 tons. Your territory may be open—write.

MASTER TRUCKS

MASTER TRUCKS, Inc., CHICAGO, ILL



MASTER OF THE LOAD ON ANY ROAD

Activities of the Motor Truck Association of Philadelphia

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COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

Motor Truck Men Discuss Pending Legislation

To Help Pennsylvania Motor Federation in State Opposition

THE Motor Truck Association of Philadelphia, at its monthly meeting at Hotel Adelphia, February 19th, was one of the most largely attended meetings in the history of the Association, 224 being present, went on record as opposed to a number of objectionable features in pending legislation at Harrisburg, affecting the motor truck industry, and unanimously decided to become a member of the Pennsylvania Motor Federation, to co-operate with them in matters affecting motor vehicles of all kinds.

They were assured by representatives of the Pennsylvania Motor Federation, which has appeared before the Committee of the Legislature having these bills in charge, that a number of their objections had already been considered and that the objectionable features would probably be eliminated from the Ditrich Bill, which they said was the one receiving the most serious consideration of the Legislative Committee.

The meeting was presided over by Thomas K. Quirk, president.

Sergeant-Major Cormack, an Australian, who fought in the British Army, gave an interesting talk on the war.

W. H. Metcalf, secretary, reported that forty members of the Motor Truck Association had drawn for spaces for the Motor Truck Show, to be held at the Commercial Museum, March 17th to 22nd, under the auspices of the Philadelphia Auto. Trade Association, in co-operation with the Motor Truck Association, and that 51,000 sq. ft. of floor space had been sold.

Robert P. Hooper, president of the Pennsylvania Motor Federation, spoke on pending legislation, and urged the Association and allied organizations to become members of their Federation, so they could present a solid front whenever they wished to be heard by state, county or city authority. He stated that the provision in the present motor vehicle bill being considered to restrict the length of trucks to twenty feet was a mistake, and would probably be increased to twenty-five or twenty-eight feet, although the committee was opposed to the latter length at present. He also advised the truck men to be satisfied if the bill allows a 24,000-lb. maximum capacity, and stated that he believed the width of bodies would be restricted to about ninety-six inches. The fee of $100 provided in the Ditrich Bill, he thought, was reasonable, as against the maximum fee in the Buckman Bill, which was exorbitant.

James L. Adams, of Pittsburgh, chairman of the Legislative Committee of the Pennsylvania Motor Federation, spoke also on the Ditrich Bill, and stated that the question of highways was one of the greatest economic questions of the day. He said that in four years Pennsylvania will spend from $75,000,000 to $80,000,000, in addition to the Government's appropriation for good roads, and that $200,000,000 would be spent within ten years. Automobile trades using highways, he stated, must submit to reasonable regulations of speed, weight and dimension, but the industry must not be throttled by unfair regulations. If the weight of motor trucks and loads is to be increased, he explained, the character of highways must be changed, but that, as public money was used for such changes, and a comparatively few required the heavier roads, the motor truck men must remember that general funds have to be used.

B. Miller, of the Miller North Broad Warehousing Co., discussed features of proposed legislation, and made a plea for larger bodies to permit of the bulky but light loads.

W. W. Woodruff, of Strawbridge & Clothier, also spoke on the same point, and remarked that the bill did not increase the passenger car tax, but increased the truck license fee nearly 200 per cent.

E. J. Berlet, of the Stability Motors Co., speaking for the Legislative Committee of the Motor Truck Association, remarked that it was significant that there was no change in the passenger car rate, and that the increase was all on the truck end, the increase having been from $25 in the existent bill, to a $100 maximum in the Ditrich Bill, and a $400 maximum in the Buckman Bill. He also called attention to the fact that four-wheel trailers were covered by the bill, but two-wheel trailers were not.

R. D. Leonard, general sales manager of the Atlantic Refining Co., discussed the importance of fair treatment to the motor truck industry by the state authority, pointing out that 40 per cent. of the fuel used by automobiles was used by trucks in 1918, when 4,000,000 miles were covered by trucks in this country, hauling 400,000,000 tons of freight.

Clinton Rodger Woodruff spoke on the Philadelphia Charter Revision Bill.

J. I. Blakslee, fourth assistant postmaster-general, at Washington, made a most interesting speech on the use of motor trucks in the United States postal service, and outlined his plan of increasing the food supply and incidentally lowering the cost of living.

A Separate Ministry for Road Transport in United Kingdom

As the need for some extent of national control of and co-ordination of transport is fully recognized in Great Britain, it has been proposed to include all matters relating to road traffic under the control of the Transport Board. At the same time it is proposed to nationalize the railways. Such a step would have the effect of placing road transport under the same management as that responsible for results from the railways, and it was feared by many that thus, road transport would be sacrificed to railway interests. Accordingly, as a result of the pressure brought to bear, it is now proposed to establish a Ministry of Ways and Communications, under which road transport will be included.

Ryan & Hughes Co., Inc., 1698 Broadway, New York City, has been appointed sole distributor of Braender tires and inner tubes in New York City, Staten Island and Long Island.

Have You Done Your Share to Make Roads Better?

Through Ice, Snow, and Mud

—of shell-torn France, dependable UNITED STATES TRUCK TIRES performed with all the precision and effectiveness of seasoned veterans.

Such plunging and lurching over all manner of roads would "kill" ordinary tires—under such conditions none but GOOD tires could stand up.

With the return of peace comes a demand for commercial carriers capable of greater speed under heavier loads.

Every day the question of tire equipment for these new fleets becomes more important.

'NOBBY CORD' PNEUMATIC TIRES increase the speed—cut repair bills—and protect the machinery of your customer's truck.

Stock a tire whose brilliant war record demands an A-A-1 rating in after-war transportation circles.

United States Tires
Are Good Tires

Eliminating Useless Operations Reduces Cost of Road Building

What One Road Contractor Did to Make His Trucks Earn More Money

THE secret of success in reducing operating expenses in the construction of roads in the cities and rural highways, is in reducing the cost per ton-mile in handling supplies," states Ira Lain, successful road building contractor, of Bloomington, Ill. Lain was formerly in the retail coal business, but saw greater possibilities of making money in road construction. After observing the leaks in operating expenses among other contractors who ignored trucks and various other labor saving machinery and devices, Lain made a careful study of road making before investing in his outfit and before bidding upon contracts.

When he had the subject well in hand, he plunged and found that his calculations were correct, and that the business could be made profitable if properly handled. One of the points that he discovered was the waste of labor in delivering material to the concrete mixer. He noted that most contractors hauled their cement and crushed stone to the vicinity where the mixer was working, and dumped it promiscuously. When the mixer was ready to receive the product, additional handling with shovels and wheelbarrows became necessary.

Uses Two-Ton Dump Body Trucks

Lain bought two trucks with dump bottoms, and timed their movements so that they could dump their loads directly into the hopper of the machine. While one truck was feeding its load at intervals into the magazine of the mixer the other was at the railroad car, securing a fresh supply. This scheme effected considerable saving in labor and was especially valuable last year when labor was scarce and demanded high wages.

Lain uses 2-ton trucks, believing them to be the most economical for handling brick, stone, sand, cement, etc. He found that each displaced four teams for short hauls. For four-mile hauls, they displaced six teams, and for six-mile hauls they displaced seven teams.

Contractor Lain buys his concrete mixture in car-load lots, and times its arrival with the commencement of the construction of the concrete base. His trucks, equipped with hydraulic hoists, are loaded by auto crane clamshells, and carry the mixture to the mixers. The trucks are equipped with an end-gate, supplied with a cutoff, which permits the mixture to feed into the mixer, after the truck has been backed up against the machine. Two trucks, which handle three tons per trip, and making four trips from the car to the mixer per hour, keep the machine fully supplied, one being enroute to the car and back while the other is being unloaded. The addition of cement, carried in sacks, is the only movement in handling the product in which machinery is not involved. This cement is dumped into the mixer by the operator of the machine. One man operates the auto crane clamshell at the car; two men drive the trucks; while a fourth operates the mixer. Men with wheelbarrows move the prepared mixture from the machine to the roadbed. The saving in labor over the old-time method is 50 to 75 per cent., in addition to securing greater speed and greater efficiency.

Special Arrangement for Handling Bricks

Contractor Lain also utilizes trucks to great advantage in handling bricks. He times his bricks to arrive when his men are ready to lay them, and he does not unload them from the car until the workmen are ready to receive them. The trucks are equipped with an iron plate, four feet in width and six feet in length, which is attached to the end gate to provide a runway by which the bricks are slid from the dump bottom of the truck by gravity, to the exact place where they are needed. The use of the plate prevents the brick from breaking when unloaded, and there is practically no loss in this direction. As the pavement is laid, and before the pitch and tar filler is applied, the trucks move over the newly laid bricks on two tracks of wooden boards, which are laid in sections as the work proceeds. Each is 25 in. wide and 16 ft. long for each section. These tracks distribute the pressure upon the brick and prevent damage before the filler has been applied.

This system not only reduces breakage to the minimum, but also keeps down the labor expense to the lowest possible point.

Trucks Save Money Hauling Heavy Tile

In the removal of heavy drainage tile from the railroad station to the ditch excavated, Contractor Lain was also impressed with the great advantage and economy of trucks. There were 175 car loads of tile, each tile weighing 980 lb. Due to the necessity for haste in completing the hauling, Contractor Lain used his two trucks and five teams of horses, and moved the consignment a distance of five miles. He was thus enabled to make an interesting comparison of the expense and speed of both. He loaded six tiles, weighing a total of 5880 lb., upon each vehicle, the truck taking the same number as the wagon pulled by a team of horses. By crowding his horses, he made them cover three round trips, or thirty miles per day. This was an unwise strain, as 24 miles per day is about the maximum for equines with such a load, without seriously injuring them. Each motor truck made ten round trips per day, more than three times as many as the horse-propelled vehicles, even when the latter were unduly crowded. One man drove the truck and one man drove the horses. The same force that loaded the wagons loaded the trucks, and the same force at the other end that unloaded the wagons, unloaded the truck. This made an exact balance of operating expenses, estimating that the horse feed cost about the same as the oil and gasoline of the trucks. The comparison showed that the trucks were capable of doing more than three times as much hauling as the horses.

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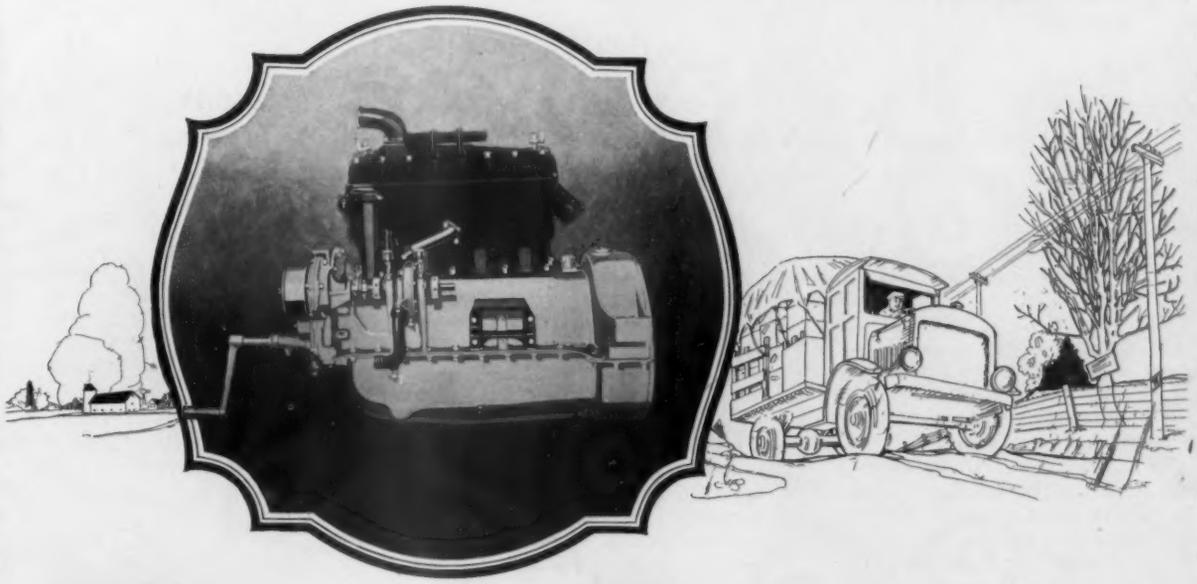

Buda

TRUCK and TRACTOR

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Engines

Nineteen months of war did for the Buda Engine what ten years of ordinary usage could never have done—it conclusively proved Buda's ability to deliver constant, heavy-duty power under all manner of transportation conditions.

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The Buda Company, Harvey [Chicago Suburb], Illinois

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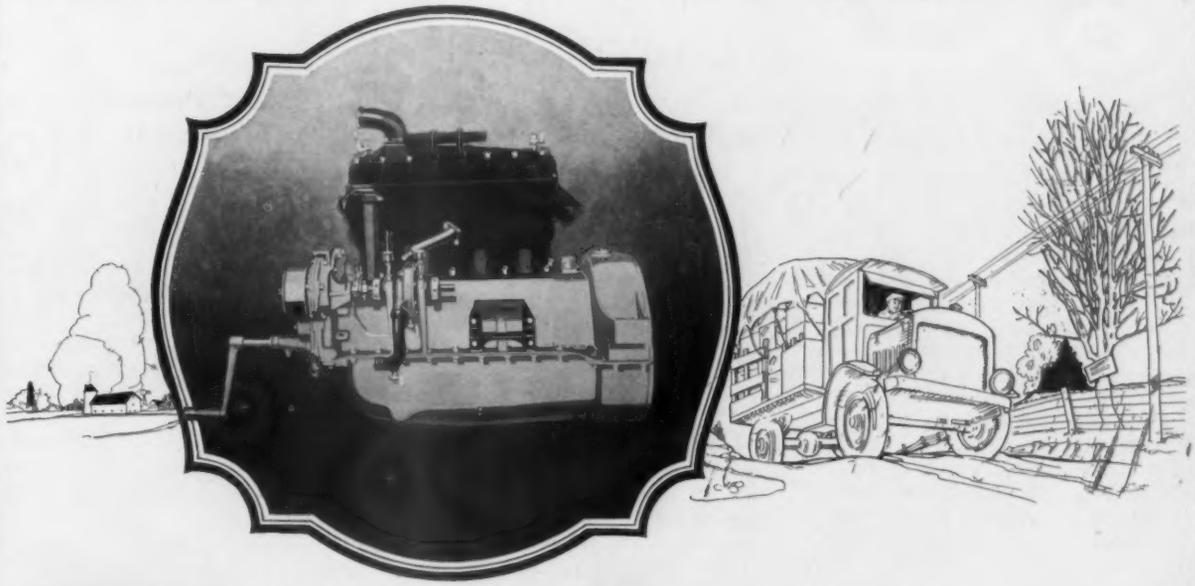

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The Buda Company, Harvey [Chicago Suburb], Illinois

Road Builders Advocate National Highway Commission

Look Forward to Great Improvements in Highway Construction. Heavier Bridges and Wider Roadways Needed. Favor Limiting of Weight to Twenty-Eight Thousand Pounds

By C. P. SHATTUCK

NEW YORK, March 1.—When the sixteenth annual convention of the American Road Builders' Association adjourned last night, after four days of day and night sessions, the delegates had placed themselves on record by two resolutions, one favoring the creation of a National Highway Commission for carrying out the provisions of the Federal Aid Act, and the other specifying truck weights, sizes and speeds. The last named resolution differs in some respects from the truck standards advocated at the Highway Congress under the joint auspices of the American State Highway Officials and the National Highways Industries Association, held at Chicago in December, in that the New York convention resolution advocates a speed limit of 15 m.p.h. for trucks and trailers equipped with solid tires, and that the load per inch width of tire (measured at the base of the rubber) shall not exceed 800 lb.

Adopts Twenty-Eight Thousand Pound Limit

The limit of weight in the resolution was fixed at 28,000 lb., but on four wheels, thereby taking into consideration the semi-trailer and trailer, and the total height of the vehicle is 12 ft. 2 in., or 4 in. less than advocated at Chicago. The total width is the same, 96 in., and the length 28 ft. It developed in the discussion of the report of the committee of the National Highway Traffic Association on "Regulations Covering Speed, Weight and Dimensions of Motor Trucks," which was presented by Chairman George H. Pride, that several states have under consideration truck legislation. After Mr. Pride pointed out, as was done at Chicago, that legislation restricting the size of a truck is an economic error, that the cost of carrying the load decreases in proportion to the number of tons transported, also that drastic legislation tending to increase operating costs would result in higher costs to the consumer, an amendment was made to resolution to the effect that copies be sent the governors, state legislatures and highway commissions.

Discuss Roads and Pavements

The greater part of the first day's sessions was devoted to papers dealing with various types of material, construction, etc., of roads and pavements, from which the layman gleaned the information that the engineers unanimously agreed that better foundations were needed but the highway authorities did not agree as to the best type of surface.

The report of the committee on "Sources of Unskilled Labor for Highway Work," revealed the not unexpected information that there will be abundant labor. The chief feature of the report was the statistics relating to the cost per hour. These were based on reports from 39 states, and showed that the cost had risen from 18.2 cents per hour in 1912, to 39 cents in 1918 for highway laborers. This year it will be 35.2 cents, according to the report.

Pertinent Facts About Convention

Resolutions favoring a National Highway Commission to carry out the provisions of the Federal Aid Act and limiting gross weight of motor vehicles on four wheels to 28,000 lb.

That permanent types of bridges be constructed to withstand a load of 20 tons and the posting of the capacity of all bridges.

An educational campaign to correct the impression made by some newspapers that the Federal Aid Act is "Pork Barrel" legislation.

Minimum width of new roads to be not less than 20 ft. and that grades and curves be eliminated.

Thirty-nine states report that the cost of labor for highway construction will be less in 1919 than in 1918.

That 46 cities will spend $46,000,000 on pavement in 1919, affording opportunity to employ labor.

The adoption of uniform highway signs and control of advertising highway signs.

The construction of a Roosevelt Highway through the State of New York, said road not to be less than 20 ft. in width and capable of sustaining heavy traffic.

That detours around cities and towns would greatly speed up transportation by trucks and make for greater economy.

That motor trucks will greatly increase in numbers and weights will show a tendency to increase as better methods of construction of pavement are introduced.

The construction of Federal and State Highways be advocated to absorb the unemployed in 1919.

Roads Should be Built Now

Leslie W. Sprague, of the United States Department of Labor, said, after a review of general labor conditions, that there was a shortage of 700,000 houses, and this condition, with the great reconstruction period in Europe, would create a shortage of labor. He urged that advantage be taken of the opportunity to use the unemployed to construct highways, which were imperative and an economic investment. He suggested that every delegate present use his influence in promoting highway projects, and pointed out that now was the time to build when labor was available.

Recommend Twenty-Ton Bridges

Thursday was a joint session of the American Road Builders' Association, the American Automobile Association, Highways Industries Association and National Highway Traffic Association. In his report on "Methods of Strengthening and Reconstructing Highway Bridges for Heavy Motor Truck Traffic," chairman Willis Whited, bridge engineer, Pennsylvania State Highway Department, advocated construction that would safely sustain a load of 20 tons. He stated that fully 80 per cent. of the bridges were not capable of carrying the present-day load, and advocated examination of bridges and posting signs, giving their capacities. Many bridges, he said, were too narrow for traffic and a large number should be rebuilt. Others were capable of carrying the maximum load of one truck, but not two at the same time. He also said that speed should be limited on some types of bridges, and that if this were done it would largely avoid the possibility of damage and accidents.

"It is the duty of officials in charge of the public highways to maintain them in such condition that they are safe and convenient for all reasonable and lawful traffic which may come upon them," said Mr. Whited, "and the limit of loading on the bridges of a state should be fixed by statute in order to determine what are reasonable and lawful loads. The motor truck is with us to stay. Its numbers will increase and weights will show a continued tendency to increase as better methods of construction of pavements are introduced."

Minimum Road Width of Twenty Feet

The report of the committee on "Reconstruction of Narrow Roadways of Trunk Highways, With Adequate Foundations and Widths for Motor Truck Traffic," advocated a minimum width of 20 ft., with a shoulder of not less than 5 in. In connection with the building of new highways it was suggested that a detour or by-pass constructed around towns and cities would avoid local conflicts over rights, etc., as well as facilitate the movements of trucks engaged in inter-city haulage and other forms of

Where the man with a bearing problem is apt to come

LIKE all manufacturing plants, Hess-Bright has its daily callers. Not alone those who come to sell it maintenance materials or improvements or other service—but another class—potential buyers with a mechanical problem to solve.

To these latter, and there are scores of them, Hess-Bright does not signify alone a workshop flanked by offices, drafting room and test bench. But inclusive of these it takes on a new merit: As a constructive force living for and in the interest of better bearings.

That this service should draw to Hess-Bright the problems of men with engineering interests, is proof we think that it is very much worth while.

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501

highway transportation where time is a factor in operating costs.

Although the committee of the National Highway Traffic Association having to do with the report on speed, weights, dimensions, etc., includes three representatives of the truck manufacturers, none of these were present, and the task of defining the economic advantages of the commercial car and explaining why certain suggestions made by the delegates were not practical, fell to George H. Pride, chairman of the committee, who so well acquitted himself that one delegate made a motion that the resolution dealing with weights, speeds, etc., include a clause incorporating the effect of drastic legislation on the use of trucks, etc. This was, apparently, lost in the shuffle, for it was not reported in the resolutions adopted.

Favors National Highway Commission

The report of the committee on National Highways, presented by Edward J. Mehren, recommended a National Highway Commission, and was, in part, as follows:

"Highway transportation has changed so materially within the last 10 years, due to the development of the passenger automobile and the motor truck, that the highway construction and highway transportation problems of 10 years ago have little relation to those of the present. Our highway plans of the future must be based upon the potentialities of the motor vehicle. It is necessary, therefore, to throw off the limitations of past traditions and to plan for the future with a vision commensurate with the prospective development of motor carriage.

"Today traffic cuts across not only county boundaries but state boundaries as well; the passenger car and the motor truck have entered very extensively into interstate commerce. Conservative estimates place the passenger traffic of automobiles at 45 billion passenger miles per annum, and the freight carriage at 6 billion ton miles per year. These figures are very conservative, considering that there are 6,000,000 motor vehicles in service, of which 500,000 are commercial cars, ranging from the light delivery car to the heavy truck.

"To provide adequately for this traffic and to allow the nation to benefit to the maximum from the potentiality of the motor vehicle, it is necessary to provide properly built and maintained highway routes that cut across state lines, tying the principal cities of the nation together and connecting the interior with the seaboard. Such a system, adequate to the needs of the present and future through motor traffic, can be secured only by the most perfect co-ordination between all states of the Union or by the Federal Government undertaking the construction and maintenance of those routes.

Benefit to Transportation

"Highway engineers in state employ throughout the country are agreed that the type of co-operation which would be needed between the states in order to create an effective national highway system is impossible to secure, save by a degree of Federal control which would allow the state highway departments little or no independence when acting as agents of the Federal Government, in the location, construction and administration of the Federal highways. Such subordination does not seem to appeal to the state highway officials. The alternative is Federal construction and Federal maintenance.

"The economic benefit of a national system of highways is best indicated by the extent to which motor truck routes radiating from large cities cut across state lines. Those around New York furnish an excellent example. They cut into or across the States of Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, Delaware, Maryland, etc. In other words, motor trucking routes are an important agency of interstate commerce.

"At the beginning we would recommend the planning of a highway system of 50,000 miles, or about 2 per cent. of the public roads' mileage of the country. This would be adequate to serve directly 46 per cent. of all the counties of the United States, while another 41 per cent. of the counties would be adjacent to those through which the highways would run. In other words, such a system would serve directly, or with a reasonable degree of directness, 87 per cent. of the population of the country. At a cost of $25,000 per mile, such a system would cost $1,250,000,000, and if the oppropriations for construction were made at the rate of $100,000,000 per year, the fundamental system would be completed in twelve and one-half years. Surely this is a small expenditure for a nation that raised $15,000,000,000 in Liberty loans in eighteen months, while three of its states have authorized state highway bond issues totaling $210,000,000. The estimate of $25,000 is purposely made high, though it is realized that in many sections of the country suitable materials are available for the construction of adequate surfaces at less cost. As to the administration of the system, it is our best judgment that the greatest benefit can come from a National Highway Commission, which would have no other duty or responsibility than that of studying, planning, building and maintaining the National Highway System."

WHEREAS, the President of the United States, in his recent message to Congress, recognized the value of improved highways in the general transportation system of the nation and definitely recommended and urged their rapid development; and

WHEREAS, this work is necessary to give employment to our returning soldiers and also to furnish worthy projects on which unemployed labor can be engaged during the period of adjustment, and

WHEREAS, we recognize the necessity for a well-defined and connected system of improved highways in order to expedite the distribution of large volumes of foodstuffs now wasted on the account of the lack of prompt and adequate highway transportation and to better serve the economic and military needs of the nation:

THEREFORE, be it resolved, that the present appropriations for the Federal Aid to the States be continued and increased and the States urged to undertake extensive highway construction so as to keep pace with the development of this country and its transportation needs and in carrying out the provisions of the present Federal Aid Act or any amendment thereto, that the National Highways Commission when created shall cooperate with the State highway departments.

BE IT FURTHER RESOLVED, that all government activities with respect to highways be administered by the National Highway Commission.

Resolved, That the American Road Builders' Association favor the following regulations of motor trucks on the public highways:

1st. The gross weight of vehicle and load shall not exceed 28,000 lb. on four wheels.

2nd. The total height shall not exceed 12 ft. 2 in.

3rd. The total width shall not exceed 96 in.

4th. The total length shall not exceed 28 ft.

5th. The total weight per inch of the tire (measured as the base of the rubber) shall not exceed 800 lb.

6th. The speed of motor trucks and trailers entirely equipped with solid rubber tires shall not exceed 15 m.p.h., and be it further

Resolved, That the Secretary be and hereby is directed to forward copies of the resolutions to the Governors, State Legislatures and the State Highway Commissioners.

Uniform Highway Signs

Robert A. Meeker, Newark, N. J., read a report on "Uniform Highway Signs," and displayed samples of those recommended. These designated the principal and intermediate towns, dangerous curves and railroad crossings. A sign 15 x 36 in. was recommended, of wood or metal with suitable letters and colors. The New Jersey County Engineers, through T. J. Wasser, offered to send photographic copies of the signs, etc., to each state highway commission, which tender was accepted. A campaign of education on uniform highways signs will be begun by the association.

Snow Removal Methods

The report on snow removal methods did not disclose other than conventional practice, and it included much data compiled by the New Jersey County Engineer, T. J. Wasser, and which appeared in the COMMERCIAL CAR JOURNAL last fall. General T. Coleman duPont urged engineers and highway commissioners to eliminate the curve and grade in construction and cited the practicability and economy of the plan. He advocated wider roads.

On Wednesday evening a stag dinner was held at the Waldorf-Astoria Hotel and on Friday the Fifth Avenue Coach Company tendered the use of its buses to the visiting delegates for an inspection of the New York pavements. A comprehensive exhibit of road material, machinery, etc., was arranged in the winter garden of the hotel where the convention was held.

JUST A MINUTE!

Stop and THINK About Wheels

FROM EVERY VIEWPOINT, if you have a model on which you have not already decided to use SMITH WHEELS as Standard Equipment, is it not good policy from now on to order wood wheels ***in diminishing quantities only?***

WITHIN the next ten to fourteen weeks, 23 or more additional 2 and 2½ ton models, of different makes, with SMITH WHEELS as Standard Equipment, will be put on the market, and 19, or more, 3½ ton models.

RIGHT NOW an average of one additional Truck Builder per day is deciding to use SMITH WHEELS as Standard Equipment ***on all three models***—2–2½, 3½ and 5 ton. The Trade will know about it when these truck builders work off their wood wheels—probably not before. If any desire us to publicly announce their action, we will do it in the Trade Journals at our expense.

ALMOST ALL truck builders now are improving the quality of their models. Where can the same amount of money be spent to better advantage than for SMITH WHEELS in selling the eye and mind of the prospective purchaser?

THE NUMBER of Trucks you build this year will be determined by the number you are able to ***sell.*** To put this business across is up to ***quality*** and ***salesmanship,*** whereas while the war was on, these were secondary to ***delivery,*** the production end standing the brunt.

CAN YOU not discern the Signs of the Times in the foregoing?

SMITH WHEEL INC
SYRACUSE, N.Y., U.S.A

AUTOMOTIVE MANUFACTURERS AND ENGINEERS

There is something actually new - radically new, of real interest to you.

Not only that, but its exact, positive working action is the absolute perfection of definitely measured precision- so much so, that its unfailing accuracy of operation, its almost human decisiveness of mechanical movement, borders upon the uncanny.

It's the wonderful Elbertz differential.

An entirely new differential in principle and in fact.

A new non-locking, compensating, positive drive differential, in which the problem of transmitting power to the driving wheels, in exact ratio to their respective, independent traction ability to utilize such power in propulsion force, has at last been definitely and successfully worked out.

In other Words the Wheel With the Greatest Traction Gets the Greatest Power.

To be exact: The moment one driving wheel for any cause loses any portion of its traction, the power automatically leaves that wheel in absolute proportion to its traction loss, and is instantaneously transmitted through the Elbertz differential to the wheel having normal or greatest traction.

Undoubtedly, the Elbertz differential is one of the most important and valuable contributions to automotive mechanical perfection ever made, and, sooner or later it's going to be used by every progressive manufacturer of passenger cars, trucks and tractors in the world.

You will be interested - abnormally- interested - in its complete construction and operating details - I'll take special pleasure in sending them to you personally.

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AND WE WILL SEND YOU THE DATA BOOKLET SHOWN ON OPPOSITE PAGE. ALSO BULLETIN ON KING TRAILERS, AND THE TRUCKS YOU SELL.

Covers of a few of which are shown on pages 115, 116, 117, 120, 121, 122.

What Trucks do you sell .....

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What Territory do you cover.....

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What Lines of Business in your territory predominate as haulage prospects.....

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We will gladly mail you copy on receipt of the above information

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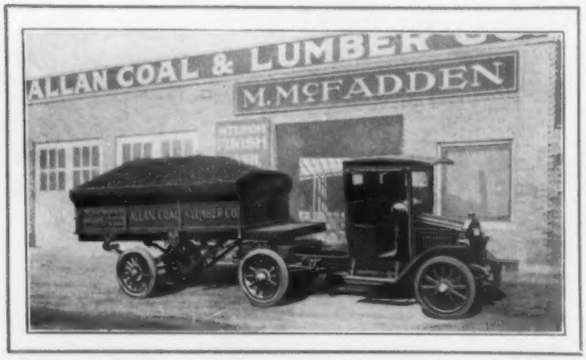

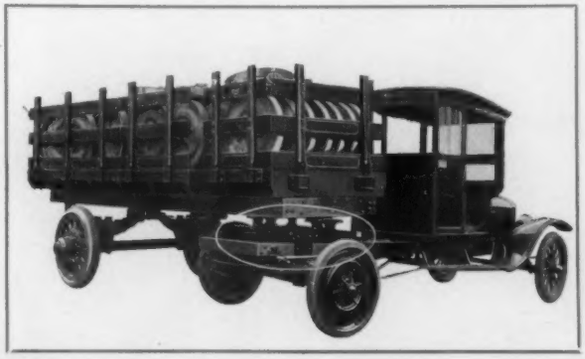

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Pull than Carry"

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Comparative Operating Cost
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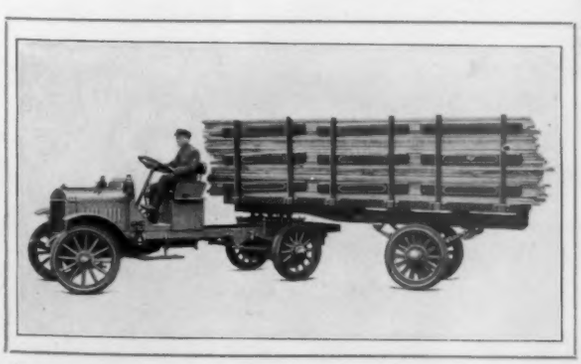

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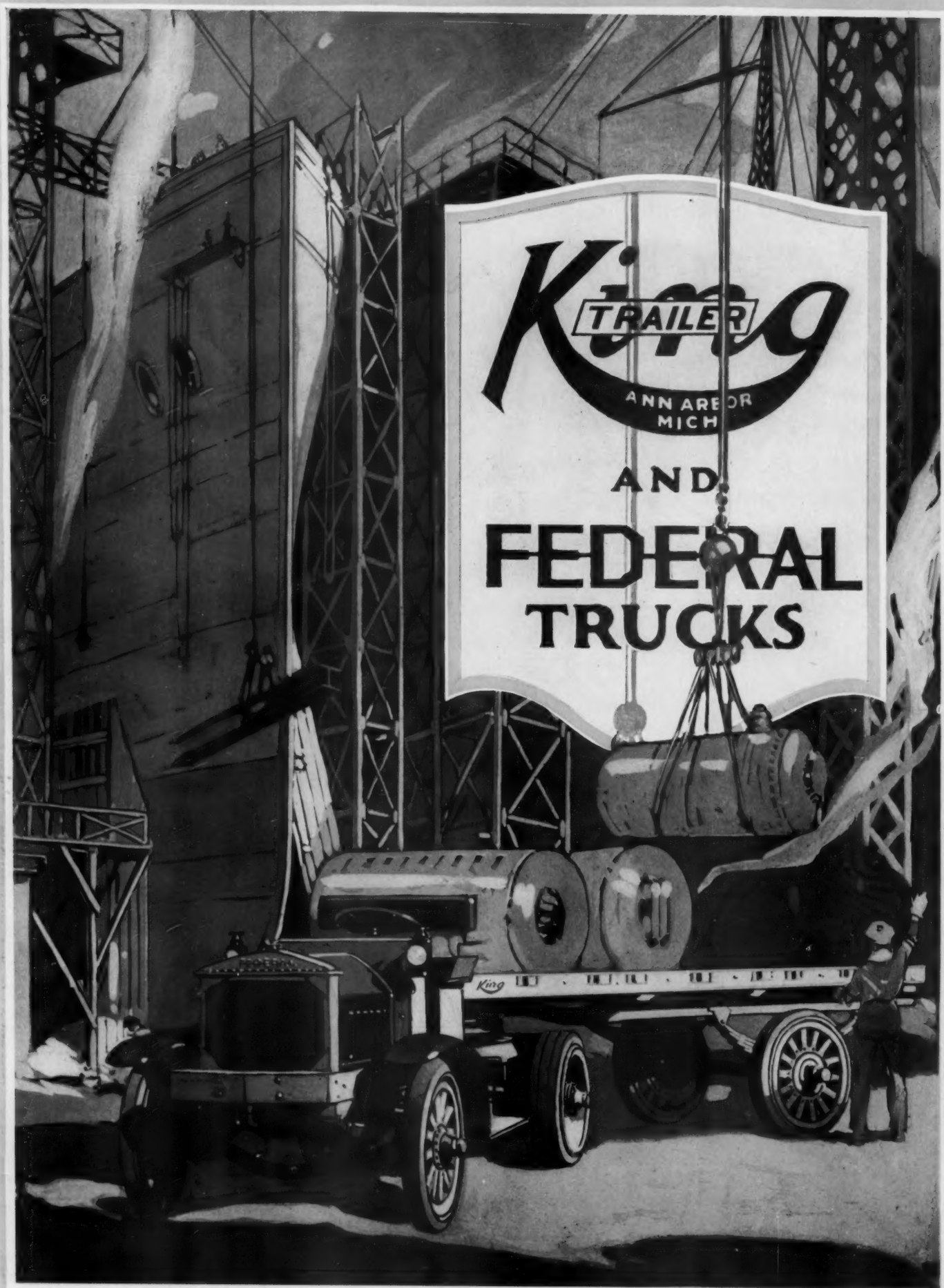
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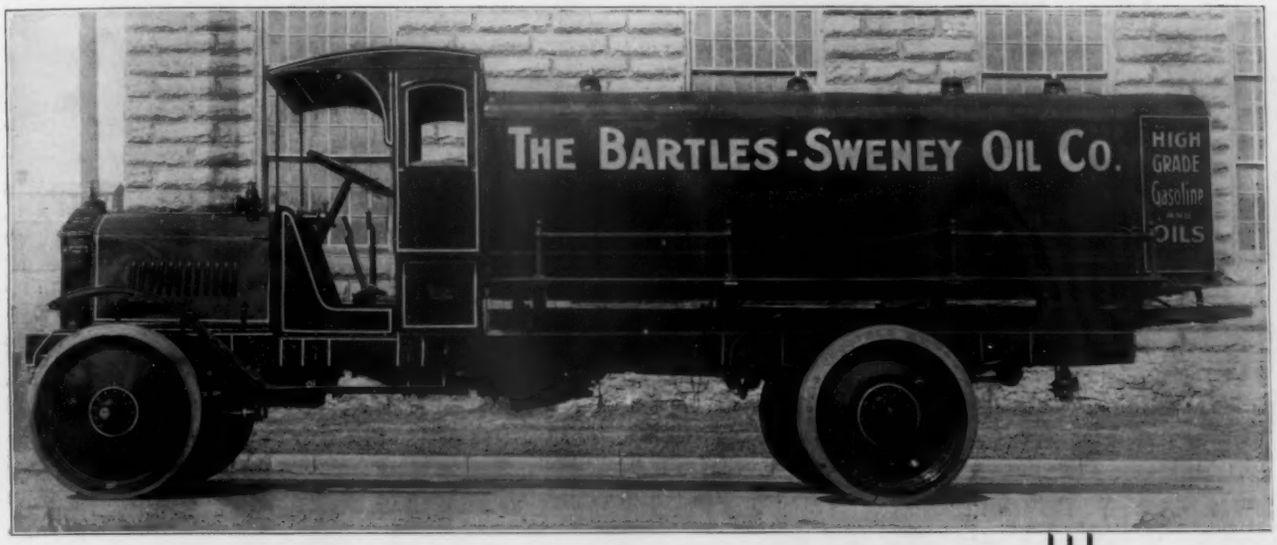

The Final Cost is What Counts

In advancing the Dart Truck Agency proposition to dealers, we assert that this line is the most economical on both a mile and dollar basis. Furthermore, selling prices are consistently modest for Dart quality ideals.

Dart trucks are sturdy, over-powered, high-duty products, designed and built to make performance records that will make prestige for both ourselves and our dealers. The trucks are meeting every demand made upon them, and so their popularity is increasing as the field of their usefulness grows.

Dart dealers are successful. Their customers, ever watchful of cost percentages, are Dart "boosters." And so sales are quickly and easily made in territories where these trucks are operating. Mile for mile, ton for ton, they are daily rising higher above competition on economy records.

This dealership is at your disposal. Its acceptance means the making of a steady, growing business. The sales plan is most liberal in its concessions. Full information awaits your request.

1, 2 and 3½ ton trucks, 5 and 6 ton trailers, and the Dart "Blue J" five-inch tractor.

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Un-retouched photograph of 36 x 6 Goodyear Pneumatic Cord Truck Tire which delivered 27,800 miles of service while running on a 1-ton truck owned by M. Burg & Sons, St. Paul, Minn.

GOODYEAR
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Saved Repairs, Fuel, Oil, Delays

"AFTER 515 days' experience with your tires (Goodyear Pneumatic Cord Truck Tires) we have found that they have not only practically eliminated mechanical trouble but they have also cut down the losses which we previously sustained in broken merchandise."—G. N. Burg, for M. Burg & Sons, St. Paul, Minn. In the same letter, he also reports fuel and oil reductions, increase in amount of ground covered and long tire mileages.

IN the beginning the above-named company had just *one* purpose in choosing Goodyear Pneumatic Cord Truck Tires.

They planned to reduce the damage done to their motor trucks and loads by severe vibrations and jars on solid tires.

But now M. Burg & Sons have *several* reasons for specifying Goodyear Cords because they have cashed in on four distinct advantages of these tires.

The cushioning power alone, of the Goodyear Pneumatic Cord Truck Tires has exceeded in results what was originally expected of these tires.

For this generous resiliency has done more than lower mechanical bills almost to zero and minimize breakages in furniture carried, formerly a considerable loss.

In combination with the traction of these tires, this cushioning has cut down the amount of gasoline and oil previously consumed by the M. Burg & Son's motor trucks.

Then, the traction of the Goodyear Cords has enabled these units to operate during two winters without the delays that occurred in past years when solid tires stalled in the snow.

Also, the wider radius of action on the pneumatics has caused the trucks to cover more ground than ever before.

All of these improvements, however, have had as their firm foundation the remarkable toughness demonstrated by the Goodyear Pneumatics, aided by proper care on the part of the drivers.

Mr. G. N. Burg points to the mileages made by the set of four Goodyear Cords on the first truck changed over, which were 20,000, 22,450 and 27,800.

This company's experience, like that of many others, points to a very broad opportunity that continually faces truck dealers.

It is clearly evident that truck agents can greatly advance their own interests by advising customers to take advantage of the *traction*, *cushioning*, *wider radius* and *toughness* of these pioneer Goodyear Pneumatic Cord Truck Tires.

THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO

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F-W-D

THIS F-W-D Truck, purchased Jan. 15, 1914, by P. W. Cope of Omro, Wis., has a record of five years of service with an average of $4.51 per month for repair parts. This truck was used as a demonstrator for two years before Mr. Cope bought it.

NOT only is the F-W-D the most economical three-ton truck on any hauling proposition, city or country, but, because the principle is right, it is the longest-lived truck built—a real investment, both for the user who buys and the dealer who sells it.

Send for particulars and Catalog

FOUR-WHEEL-DRIVE AUTO CO.
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Canadian Factory: Kitchener, Ont.

DEALERS: This is the kind of economy that your prospects understand and want. There are some excellent agency opportunities open in important transportation centers. Now is the time to act. Write or wire for details, or come to the factory.

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The Chief Engineer Knows Magnetos

If you are not an expert in ignition you may have some pre-conceived preferences or prejudices as to Magnetos.

But the Chief Engineer figures it out with mathematical exactness. He is responsible for the successful operation of possibly thousands of motors put out by his Company.

He cannot afford to take chances, and guesswork has no place in his calculations. **He** must be sure!

When 132 manufacturers, through their Chief Engineers, adopt the Eisemann Magneto as standard equipment for their trucks, tractors, passenger cars, etc., **you** may be sure that there are compelling reasons.

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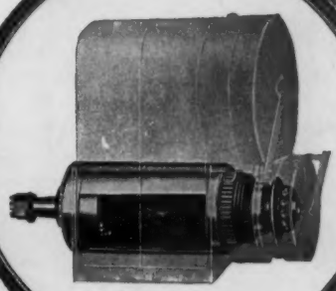

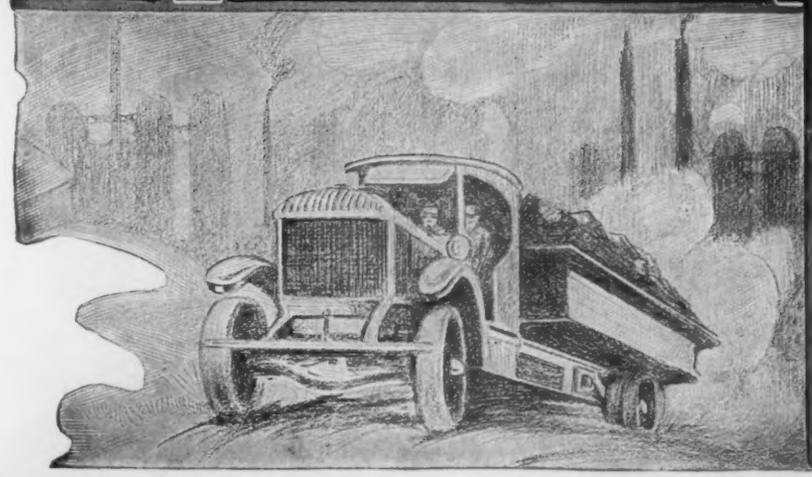

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The making of the armature of an Eisemann Magneto is an excellent illustration of the exhaustive and scrupulous attention to detail through which this Company has realized its determination to produce the finest magneto that can be built.

To complete the armature core and winding from raw material to finished product requires 49 distinct operations, inspections and tests. Though these processes cannot be described here, it should be pointed out that owing to the extreme care applied both to the selection of materials and to the processes of construction, Eisemann armatures practically never short-circuit or burn out.

"The Boss Knew His Business When He Put On This Baldwin Chain"

The truck driver knows from experience that the name Baldwin is a guarantee of dependability no matter how heavy the load, or how hard the going. And the truck owner, who operates a Baldwin-equipped truck, or who has replaced his worn-out chains with Baldwin, has learned the economy of Baldwin quality.

The confidence of owner and driver in Baldwin Chains is well-placed for Baldwin materials and methods of manufacture guarantee the dependability of its products. The side plates of Baldwin Chains are made of high carbon, cold rolled steel.

The pins are made of nickle steel, properly case-hardened, and refined to give a hard surface, and a very tough interior. Baldwin hardening facilities and methods measure 100% in efficiency. Every heat is inspected by an expert, and samples taken before it is allowed to enter into production.

Such painstaking methods follow all along the line in the production of Baldwin products. Little wonder then, that Baldwin Chains and Sprockets are the choice of truck owners and drivers to whom quality is the first consideration.

The long experience and expert knowledge of Baldwin engineers are at your disposal in working out your transmission problems.

Baldwin Chains are Carried in Stock by

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American Automobile & Supply Co.
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Motor & Machinists' Supply Co.
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C. J. Smith & Co.
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M. A. Bryte, Inc.
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J. M. Howe
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*"Baldwin—
It's the Chain that
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DUPLEX TRUCKS
Cost Less Per Ton-mile

Which do You Sell?
A Machine or Cheaper Ton-Miles?

The dealer who sells the Duplex 4-Wheel Drive sells haulage at a lower cost per ton-mile.

That is what the business man wants to buy.

He wants to know, without any doubt or question, that he can replace his present haulage and make the investment pay.

There the Duplex dealer has the advantage—from actual Duplex records.

He can ***prove*** that the Duplex saves from 20 to 60 per cent in haulage costs.

He can prove that this is so, whether it is used on city streets or wilderness trails.

We are telling the business men of the nation, through The Saturday Evening Post and Literary Digest, that Duplex ton-miles cost less.

This national advertising makes more valuable the franchise to sell Duplex 4-Wheel Drive Trucks.

Send for literature

DUPLEX TRUCK COMPANY
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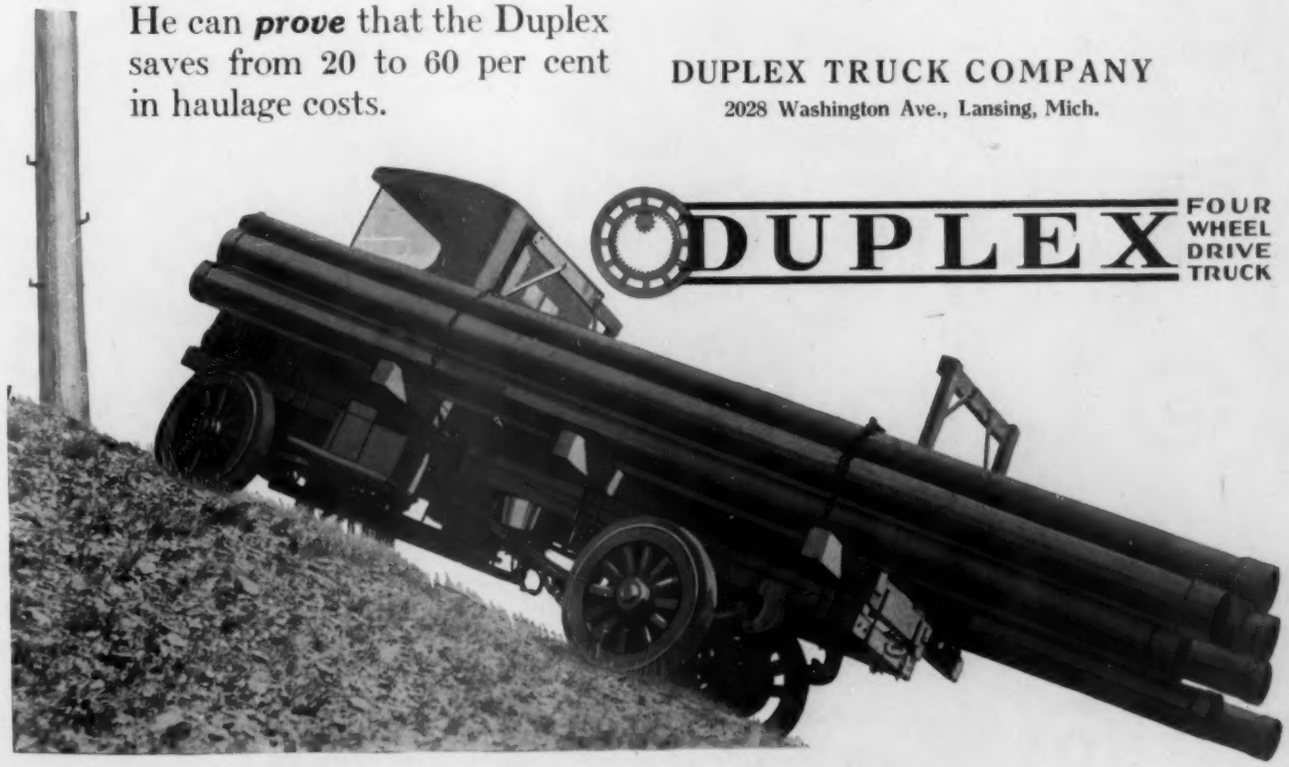


WATSON

UNIVERSAL SERVICE TRAILERS

The illustration shown below tells the real story of "short-turning radius"—a leading efficiency feature in Watson Trailer design. This particular trailer is attached to a Watson 100% Tractor, but it is also as quickly adaptable to trucks and even passenger cars of all types. The Watson Fifth Wheel and Spring Drawbar accomplished this. It is easily attached.

The Watson Trailer gives pronounced economies. Its ease of turning (three Watson units can turn in a 20 ft. street), accurate backing quality and quick hitching and unhitching appliance all unite in saving time and fuel.

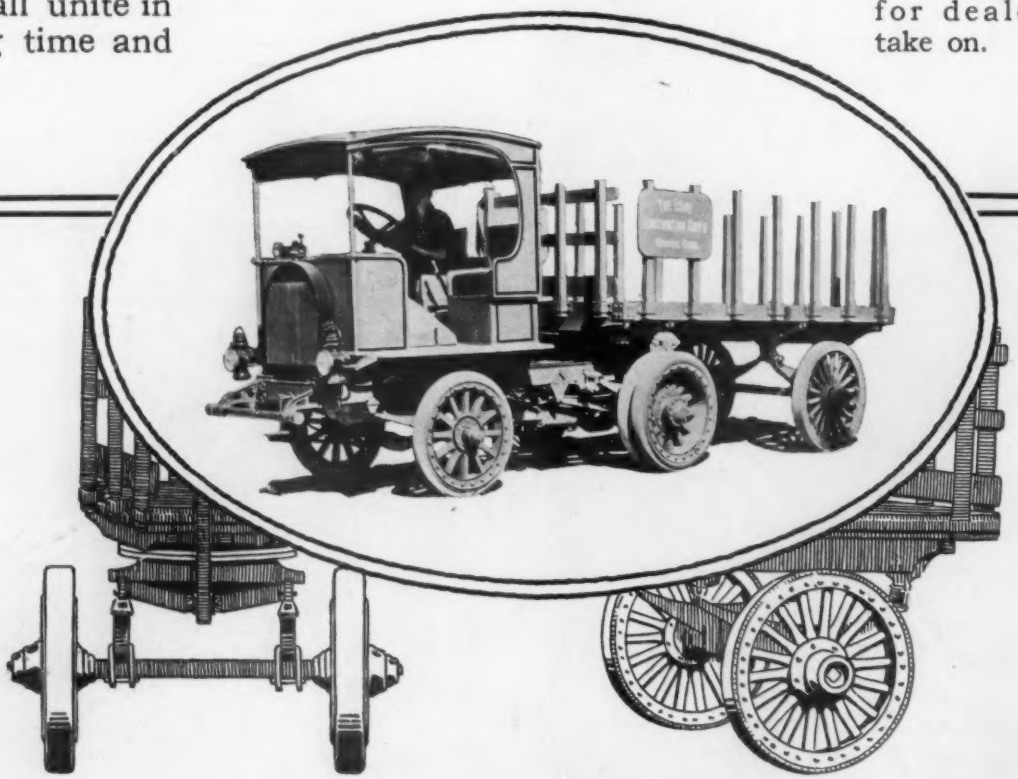
100% WATSON TRACTOR

A giant in power and endurance. Built for heavy-duty work and stays on the job. A splendid complement to the Watson Trailer.

This trailer does not track. It is virtually a mobile part of the power unit, thus avoiding sidesway and weaving—two evils that are responsible for heavy cost of operation and upkeep.

From the standpoints of design and construction, Watson Trailers offer a maximum of service. The first cost is practically the last. In fact, they are in every aspect the most logical, serviceable and profitable line for dealers to take on.

Watson Wagon Company
46 West Center Street, Canastota, N. Y.



ARMLEDER MOTOR TRUCKS

An Agency With a Future

is more to be desired than an agency with a spectacular, for-the-time-being profitable representation. The latter leaves only failure, a bad reputation and "junk heap" trucks in its wake.

We want responsible dealers who see the wisdom of taking on the sturdy Armleder 2 ton and 3½ ton trucks.

On the other side of this advertisement we have stated the construction policy responsible for these commercial truck giants of endurance and power.

In the tremendous increase in the use of trucks there will never be a look backward—never a retrogression in demand—but an increase always.

The Armleder Dealer will grow with that future, because he is selling a line as enduring as is truck-making progress. He is selling a truck with a character that is reflecting itself in the work it does.

Join our field sales organization and assure yourself present and future success.

Write for our liberal sales plan.

The
O. Armleder Co.
Cincinnati, Ohio.

ARMLEDER MOTOR TRUCKS

Design—What It Stands for

A steel bar 1 inch square is practically unbendable. Hammer it out flat to ⅛ inch and it will bend beneath the hands. Flatten it to paper thickness and it will easily break.

This is an allegory of design

The tremendous strength and endurance of Armleder trucks is simply a question of taking a certain number of square inches of material and *designing* it to resist shocks, overloads and, to a big extent, the abuses of ignorant or careless operators.

It is this principle put into practice that has given Armleder pre-eminence in the field of trucks that endure.

Call it service, if you please. We call it *in-built* endurance, the result of a designing departure (from the generally accepted forms) which we have made in the shaping and tying together of several different parts. We refer specifically to parts noted below. The trained eye will at once see why our way is different and vastly better.

The O. Armleder Co.
Cincinnati. Ohio.

Distinctive Features:

Armleder patented, full-floating, "no shackle" **springs.** Non-whipping **propeller shaft.** **Armleder ever-hold** non-drag **brakes.** Armleder special design **radiator.** **Radius rod design.** Non-sheer, stronger, reinforced **frames.** Perfected **unit power plant.**

Reliability

W
WESTINGHOUSE ELECTRIC

A truck is no place for delicate, complicated equipment. Everything on it—from tires to top—gets unavoidably the roughest kind of treatment, and must be built strong and rugged to give successful service.

Westinghouse Electric Automobile Equipment

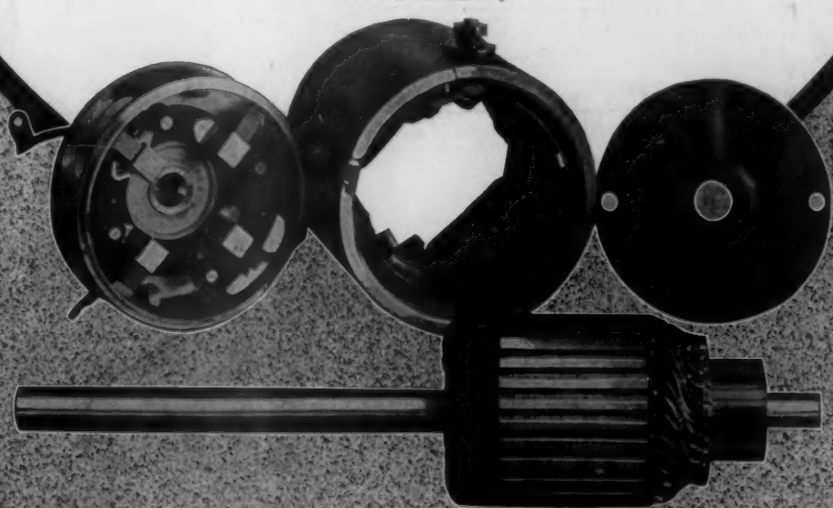
can be depended on to stand up under the severest kind of reasonable usage.

Note the simplicity of the starting motor shown in the illustration. The forged-steel frame, machine-moulded brackets, heavy shaft, and large bearings assure great mechanical strength. The generous use of copper prevents burn-outs. The windings are so treated that they form a solid mass, that cannot work loose under vibration, and will withstand engine temperatures indefinitely.

All parts are protected from dirt, oil and moisture; and the wearing parts are so proportioned that their life is longer than that of the car.

Westinghouse lighting generators and ignition apparatus are built on the same simple, reliable lines.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Automobile Equipment Department
General Sales Office, New York City, 110-114 West 42nd Street
Branch Sales Offices: Cleveland, Ohio, 1900 Euclid Building; Detroit, Mich., Kresge Building; Chicago, Ill., Conway Building
Works, Newark, N. J.



Westinghouse

Brown-Lipe-Chapin

DIFFERENTIALS

ARE standard equipment for over seventy-five per cent of the passenger car and truck manufacturers of the United States. This fact alone is sufficient evidence of exceptional quality.

The improved SPIRAL BEVEL GEAR is peculiarly a Brown-Lipe-Chapin product. Its development is the result of extensive experiments and mathematical analyses.

Full information on request

Brown-Lipe-Chapin Company
DIFFERENTIALS
Syracuse, N. Y.

How E. J. Harvey Established a New Quality Standard for Automobile Springs

TODAY automobile dealers can supply their patrons with a spring that is both easy riding and practically unbreakable, thanks to the skill and perseverence of E. J. Harvey of Racine, Wisconsin.

For a long time, the spring was almost overlooked in the consideration of automobile construction. It was taken for granted that a bump in the road meant a bump to the automobile riders. And a broken spring now and then was accepted as a matter of course.

E.J. Harvey, a man with much manufacturing experience and an inherent characteristic of doing things right, saw the importance of the spring in motor car construction. He saw that easy riding, non-breakable springs meant more than just comfort and safety for car occupants. He saw the vital relation of spring action to car up-keep—the effect of springs on mechanism and tires both.

He then set out to build the perfect automobile spring. But even when improved processes of manufacture and general design had created a spring of unusual resiliency and strength, the problem was far from solved. Then the individual requirements of each make and model of automobile built had to be considered seperately, for each presents a different spring problem and requires a different spring design.

But Mr. Harvey's skill and perseverence conquered all these obstacles, and today, there is a carefully designed Harvey Spring, of genuine Harvey standard construction, for every make and model of automobile.

And the Harvey selling organization places the fruits of Mr. Harvey's work within easy reach of every automobile dealer. No matter where he is located there is a Harvey jobber near who can supply him on a moment's notice *any* Harvey Spring he needs.

The Harvey Spring Book, which is sent free upon request to any dealer, lists all the different styles of Harvey Springs (900 of them), gives their weights and measurements, and tells you about the features that make the Harvey the highest standard automobile spring manufactured today.

In writing for this booklet address

Harvey Spring & Forging Co.
1053 Seventeenth St. Racine, Wisconsin

BOLTLESS AUTOMOBILE SPRINGS
Easy Riding-Guaranteed

Are You Sharing in Success or Striving for It?

There is one big vital reason why it is a fact that "Once a Signal dealer, always one." Signal dealers are sharing in Signal success.

They are sharing in the prestige, faith and confidence, the business that accrues to a motor truck of proved, day in and day out dependability.

They have learned in the last five years of selling Signals that they are selling a motor truck buyer the one thing of all things he wants—ability to be "Always on the Job."

They have found that a pioneer truck—one that by its serviceability and durability has won its right to a lasting confidence in the hands of owners—is a profitable truck to handle.

They know, of course, that to be a pioneer—to have stood the trials and tests of years of service—to have come thru with a clean service record—to have been "Always on the Job," a truck that has proved the points which count most in the buyer's mind.

And these are the very things which made Signal success. These are the things that have made Signal trucks such substantial, profitable investments for dealers and owners both.

Think them over. Are you sharing in success or striving for it?

The Signal Company wants dealers. We want them to share in Signal success. We are always glad to talk Signal, and the advantages of the Signal agency to a man who knows the value of a proved truck and a proved truck's record.

Five sizes—1, 1½, 2, 3½ and 5 tons—and the point to remember is that they can be delivered *quickly*.

SIGNAL

Motor Truck Company

DETROIT, MICHIGAN

SIGNAL 1-1½-2-3½-5 TON

PIERCE GOVERNOR

THE TRUCK INDUSTRY'S PIERCE GOVERNORS CHOSEN STANDARD

ENDURANCE

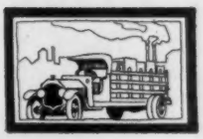
Motor Truck Economy is Almost Wholly a Matter of Maintenance Cost

THE mere fact that one truck costs less than another of the same capacity is no proof that the cheaper truck is the most economical purchase.

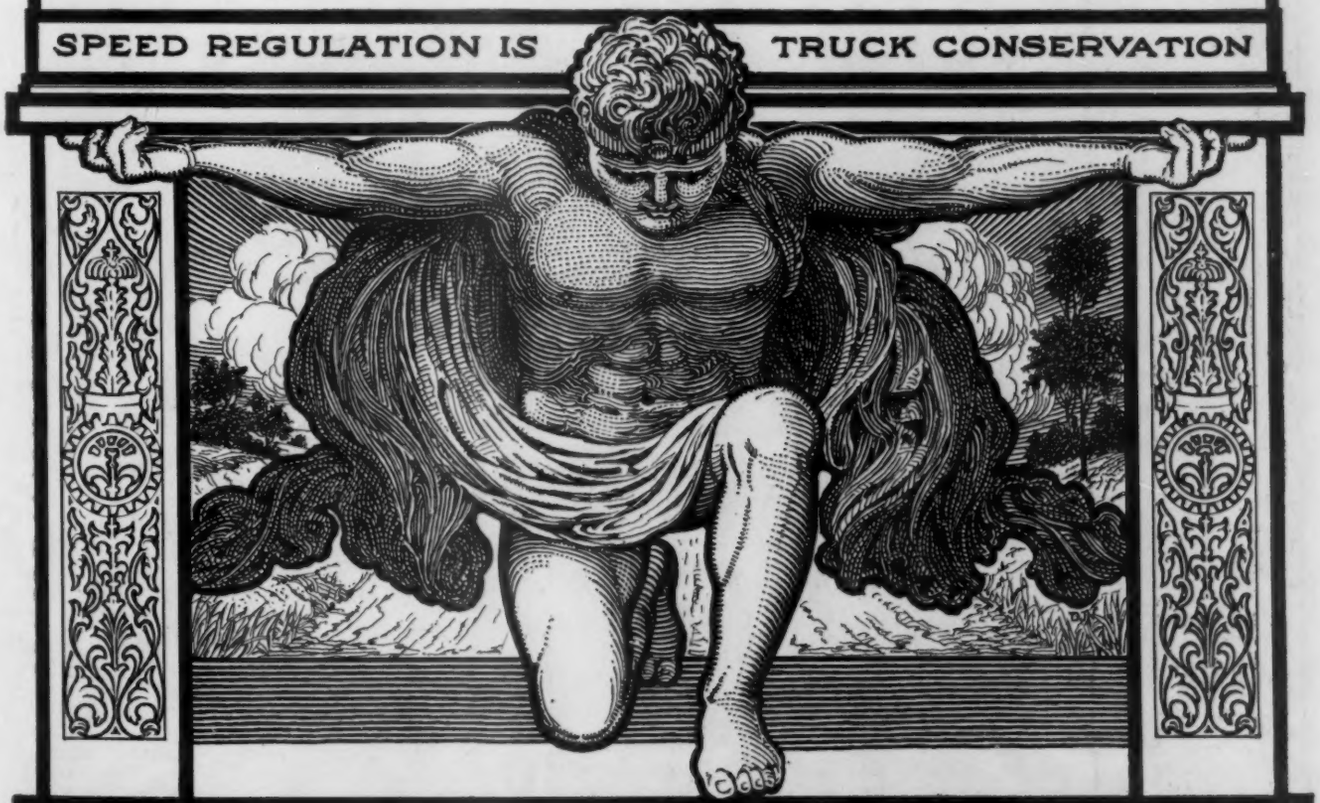
Find out which truck possesses the greatest endurance and will deliver the most ton-miles per dollar of maintenance and upkeep cost. That is what determines truck economy.

Using an inferior governor in a truck will lessen the cost a few dollars, but such a governor offers but poor protection against collisions, accidents, burnt-out bearings, scored cylinders, broken springs, stripped gears, loosened frame members and other things that put trucks in the repair shop—results of excessive speed.

There are ninety-one truck manufacturers who supply Pierce Governors and thus give some tangible proof that their trucks will endure. For real economy buy those trucks.



SPEED REGULATION IS TRUCK CONSERVATION



THE PIERCE GOVERNOR COMPANY
"WORLD'S LARGEST GOVERNOR BUILDERS"
ANDERSON - INDIANA

Columbia Axle

For Motor Trucks

Columbia Front Axles are made to stand up under the hardest conditions of truck service.

Specifications provide ample factors of safety and include materials that have been found by experience to be the strongest and best for the purpose.

Columbia Axles are built according to highly specialized methods for rapid and accurate production and the elimination of unnecessary handling of materials.

Under such methods, both machine and assembly work must be excellent in the highest degree.

Nothing better in axle material and workmanship can be obtained.

Spindles and steering arms are 3½ per cent nickel steel. Bearings are Bock type, and amply heavy to provide for any unusual side thrust or overload incidental to truck service.

Made for motor trucks of ¾–1–2 and 2½ tons capacity.

We can ship promptly.

Drawings and specifications sent on request.

Write today.

The Columbia Axle Company
Cleveland, Ohio

"Return Loads Will Cut Your Haulage Costs"

Federal Truck Offers a Business Opportunity

The Federal Motor Truck is thoroughly *known* —and backed by a national prestige of ten years' standing.

Truck experts know it, automobile men know it, and most important of all, the *buying public* knows it.

There is no gamble when a truck user buys a Federal—there is no gamble when a dealer sells a Federal. Over sixty per cent of the sales are to Federal owners who want more.

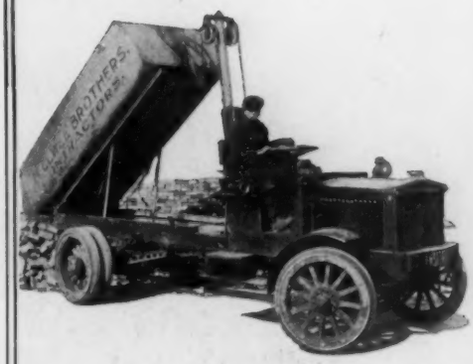
This is the kind of a product that appeals to those who want to enter the business of selling trucks. And too, this kind of a product often wants to add good progressive dealers.

We therefore invite inquiries from responsible business men who are interested in this sort of a dealer opportunity.

Federal dealer policy is not a one-sided affair. We know that responsible and progressive dealers expect and merit a profitable business arrangement and we do our part to see that it *works out* that way.

A far-seeing dealer can readily perceive the more-than-temporary advantage of connecting with a product and firm such as the Federal represents.

FEDERAL MOTOR TRUCK COMPANY
DETROIT, MICHIGAN



Another FEDERAL

FEDERAL

One to Five Ton Capacities

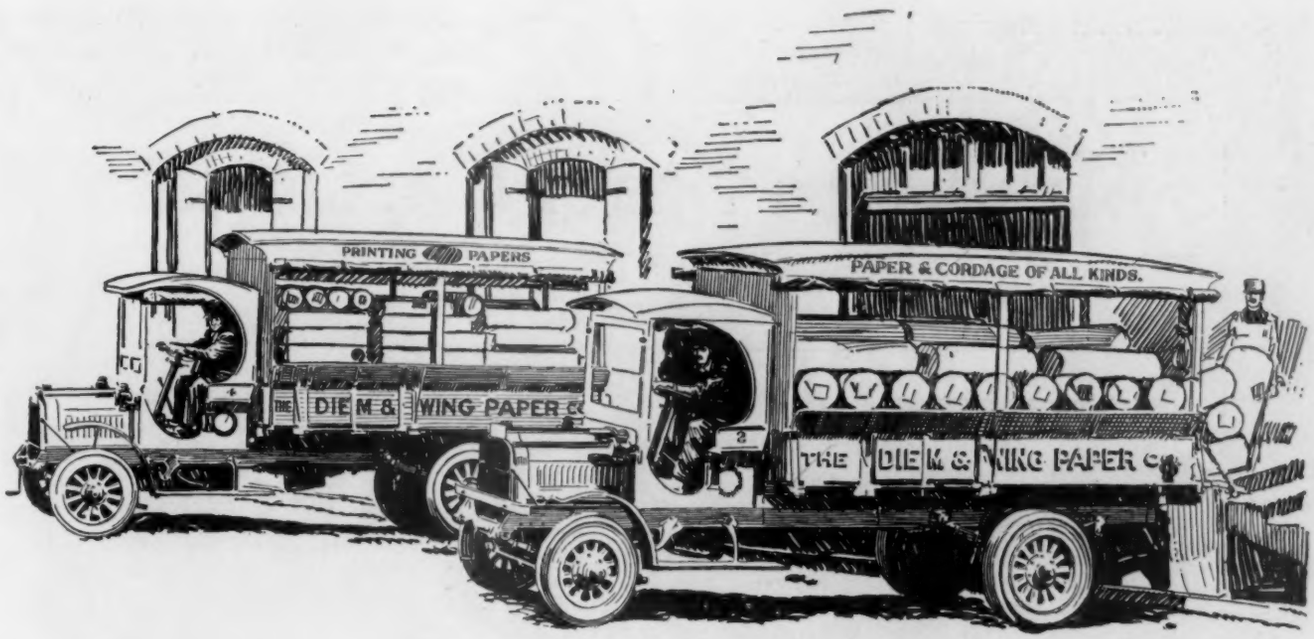
"He Profits Most Who Serves Best"

MATHER SPRINGS

Scientifically Heat-Treated

Unequalled for
Lightness, Flexibility and Endurance

Genuine made only by
THE MATHER SPRING COMPANY
Toledo, Ohio



Six months' hard truck performance
—*not one cent for repairs*

That is the performance record of two U. S. Motor Trucks owned by the Diem & Wing Paper Company, of Cincinnati.

U. S. Trucks are now used by the Army, Navy and Post Office Departments.

Over rough cobblestone streets of the city—through congested freight yards—up hill and down—loaded to the guards with heavy, bulky rolls and bundles of paper.

These two sturdy U. S. freighters have stood the tremendous strain of this traffic for six long months, without costing one cent for repairs.

Performance like this is not unusual for the U. S. Truck—there are many such cases on record. And that is one reason why 50% of the business of our dealers consists of repeat orders. The U. S. selling franchise is an asset that has helped many dealers to permanent business success. Our increased production facilities make it possible for us to take on a few more good dealers.

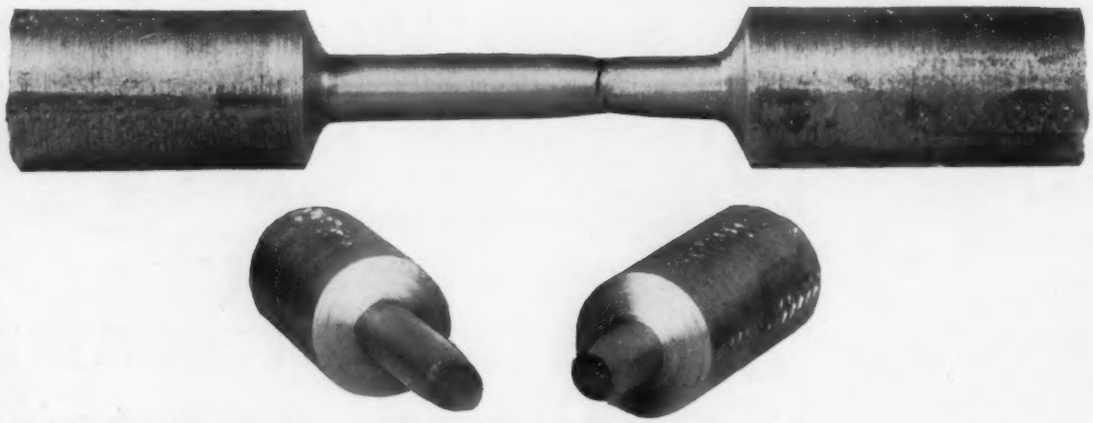
Write or wire us—your territory may be open.

The United States Motor Truck Co.
Cincinnati, Ohio

U.S. MOTOR TRUCKS

Michigan Steel Castings

Not much higher in first cost.
Very much lower in ultimate cost.



This Test Bar of Michigan Electric Cast Steel, Special Alloy-Heat Treated, Shows

Tensile Strength . .	102,000 lbs.
Elastic Limit . . .	81,500 lbs.
Elongation	23 per cent
Reduction of Area .	48 per cent

Can you afford to overlook this metal in your designing?
Send pattern for proof.

NOTE—Send some pattern that is giving you trouble along with blue print.

MICHIGAN
STEEL CASTINGS

Michigan Steel Castings Company, Detroit, Michigan

Available Trucks

Available is defined by the Standard Dictionary as meaning "Capable of being used advantageously; usable, profitable."

The Available Truck is rightly named. It is "available" in the full sense of the word to both user and dealer.

The Available is capable of being used advantageously by merchants of all classes. It simplifies their haulage and delivery problems, reduces expense, improves their service and gives all-'round satisfaction. It does these things because it was designed and built with these ends as the great objective.

The Available is profitable to dealers because the service it gives is so efficient and economical that it brings both repeat orders and creates a prestige that is constantly developing new prospects and paving the way for many sales.

The Available agency is available to dealers of the right type. We want good reliable men who can properly represent a good reliable line. To such, our proposition will be interesting. If you can qualify, write for the particulars.

Available Truck Co.
1501-49 N. Kilpatrick Ave.
Chicago, Ill.

Answering the call of Hungry Europe

Somewhere in Europe hungry families are anxiously awaiting the grain that this and hundreds of other trucks are rushing to the shipboard.

The importance of this task puts additional responsibilities on the motor truck—and on all of its component parts. Every part of the truck must help to carry the hurrying loads.

Under trying strains and hard usage, Hyatt Roller Bearings have the qualities that make motor trucks dependable.

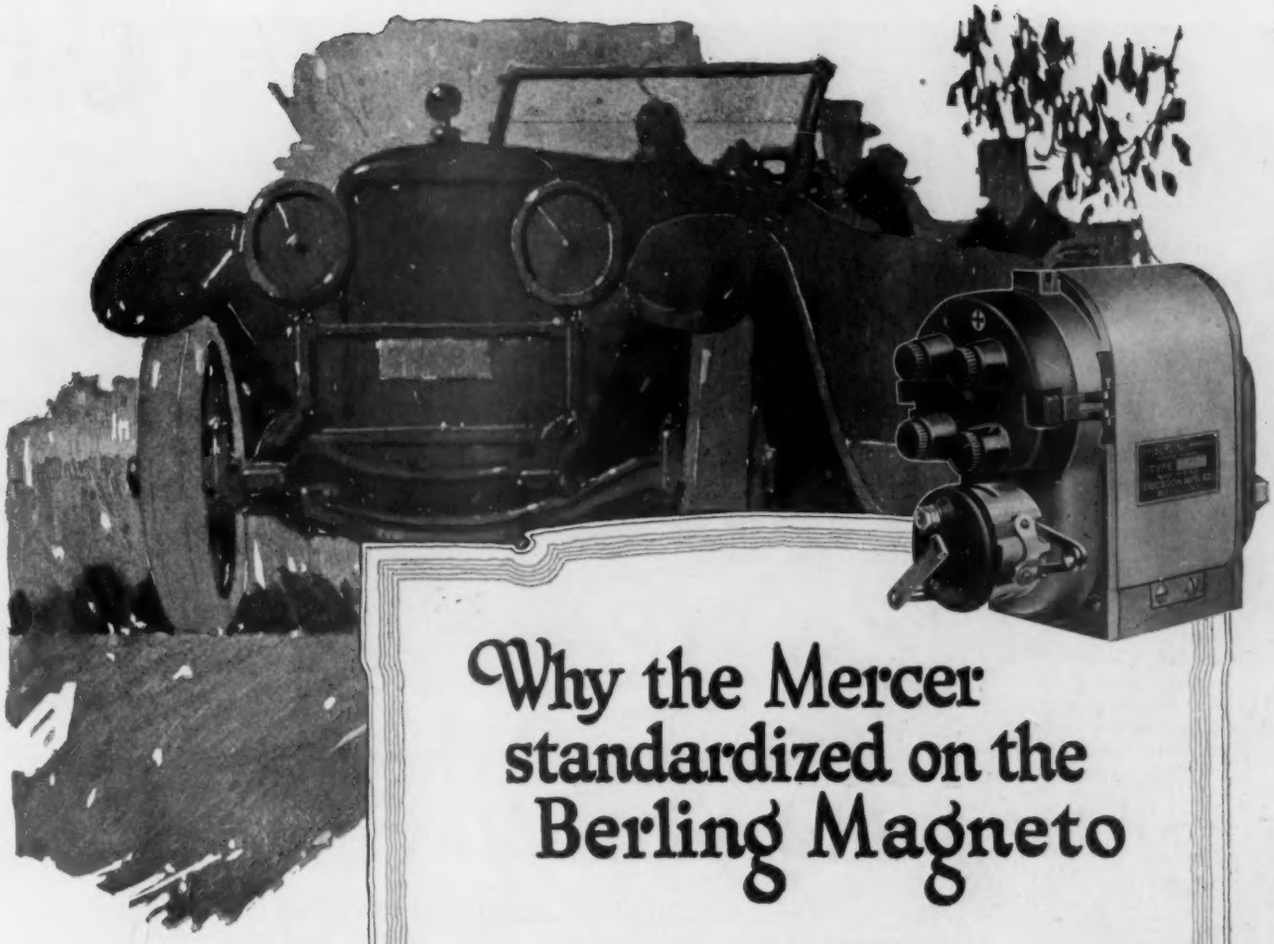
Self-oiling, self-cleaning, never needing adjustment, Hyatt Bearings serve the truck without care or cost.

Hyatt Roller Bearing Company

Motor Bearings Division, Detroit, Mich.

Tractor Bearings Div., Chicago, Ill. *Industrial Bearings Div., New York, N. Y.*

HYATT ROLLER BEARINGS



Why the Mercer standardized on the Berling Magneto

In the great war—more American airplanes were sparked by Berlings than by any other ignition

The Mercer Company's choice of the Berling is simply in line with their standard of excellence for everything that goes into the Mercer car.

And their official tests of the Berling proved this magneto to be:

1st. Absolutely dependable.

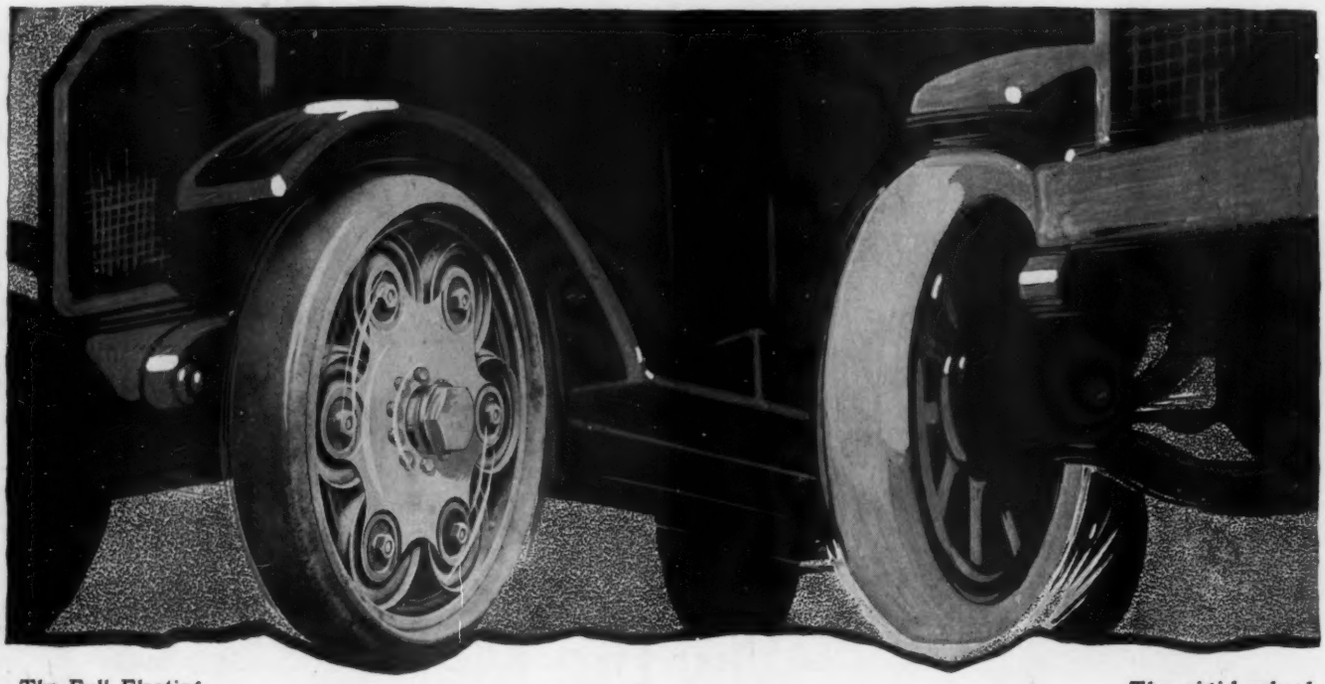
2nd. Very simple in construction and practically trouble-proof.

3rd. Possessed of a hot, fat, power-making spark.

ERICSSON MANUFACTURING CO.
BUFFALO, N. Y.

Berling Magneto

WORTH MORE DOES MORE



The Full Floating Wheel follows the road contour.

The rigid wheel bounds over rough road surfaces.

Full Floating Wheels Stick to the Road

The Jaxon Full Floating Wheel rolls over the rough roads instead of bumping.

This wheel, through the use of additional rubber—in the form of soft, resilient cushions located within the wheel—gives the needed resiliency to overcome road shocks. The cushions "float" the load.

Because of the fact that the full load is carried in these resilient cushions, the tire of the Jaxon Wheel follows the contour of the road, rolling up one side of the many small bumps and down the other, while the axle follows a comparatively straight line.

By the reduction of pounding and slippage on the road, tire mileage (by actual test) is more than doubled. And due to decreased vibration, there is less wear and tear on the truck Fuel consumption is also reduced and the truck may be driven at greater speed without injury.

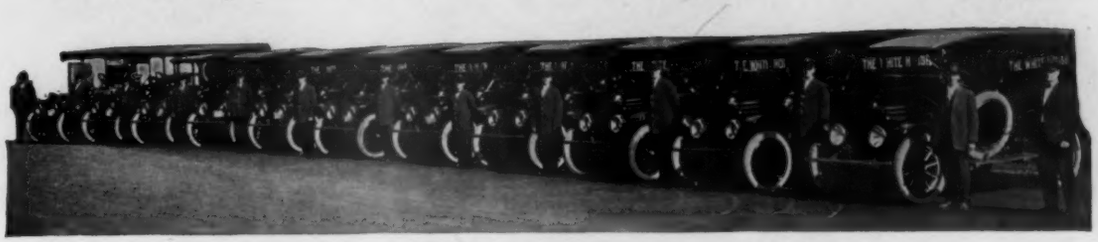
Jaxon Steel Products Company

Wheel Division, 3066 West Grand Blvd., Detroit, Michigan

JAXON

A FLEET
OF
Vehisote Bodies

Efficiency General Satisfaction Economy



Fleet of Delivery Cars Built by the Thompson Graf Edlet Company of San Francisco—All Have Vehisote Panels

VEHISOTE is in one piece and provides a smooth, jointless surface which is absolutely waterproof and cannot split or check.

VEHISOTE should not for a moment be confused with materials which are made by a laminated process in which the final product is attained by building up various "plys" of the same material.

VEHISOTE is a homogeneous, individual material, made by a distinctive and special process. Like steel, VEHISOTE is made by a fluxing and moulding process, which interweaves and interlaces the fibres into one complete fabric.

THE PANTASOTE COMPANY

NEW YORK CHICAGO DETROIT

JOBBERS

Scovel Iron Store Co., San Francisco, Cal.
Gerhab & Ludlam, Philadelphia, Pa.
C. H. Tiebout & Sons, Brooklyn, N. Y.
Wm. E. Kleine & Co., New York City
W. T. Crane Cge. Hdwe. Co., Newark, N. J.
Mossman-Yarnelle & Co., Fort Wayne, Ind.
E. D. Kimball & Co., Chicago, Ill.
Sligo Iron Store Co., St. Louis, Mo.
H. D. Taylor & Co., Buffalo, N. Y.
N. Langler & Sons, Brooklyn, N. Y.
H. Hett & Sons, New York City
E. J. Coyle & Co., Chicago, Ill.
John C. Hills, Trenton, N. J.
Wm. Stockhoff, Louisville, Ky.
E. C. Kadow & Co., Chicago, Ill.

Concrete Roads and Lettuce Salad

HAVING lettuce salad when you want it may depend on the road. That may not interest you.

But the road that makes certain you can have lettuce salad every day in the year also makes certain that you can get fresh eggs, milk, poultry, butter, potatoes and other things when you want them—and that should interest you. Think of the farm produce you would buy or sell if you could, but that now goes to waste because the roads prevent marketing.

The U. S. Food Administration estimates that bad roads in Erie Co., Pa., added at least $2,000,000 to the food bill of Erie and other cities in the county last winter.

In 1905 the Zuck Greenhouse Co. built a small greenhouse several miles out of Erie. The problem then of transporting produce to Erie and to the express companies operating out of Erie was a serious one. In 1910 the Zuck Company bought a motor truck, but the earth roads were so bad in wet weather that a team of horses always accompanied the truck to pull it out of mudholes.

Now the road has been paved with concrete. The Zuck plant consists of 13 modern greenhouses and produces large quantities of vegetables yearly.

Read what F. J. Zuck says about this concrete road:

"Now we can deliver our produce free from bruises, blemishes and disarrangements caused by jolting over rough roads through mud.

"The cost of hauling over the concrete road, when compared with the original earth road, has been reduced 50 per cent. This is due to the greater speed and larger loads possible over the concrete road, together with the reduction in cost of operating and maintaining our trucks. Added to this is the availability of the concrete road during the winter and spring, **when greenhouse food is in greatest demand.**

"Upon receiving assurances that the road upon which our greenhouses are located would be permanently improved with reinforced concrete, we immediately awarded contracts for additions to our plant. These, together with plans for further improvements, have been made possible by the economy of transportation over the concrete road to Erie."

Erie can have lettuce salad any day—and the road that will bring you lettuce salad when you want it will bring you other things you want when you want them.

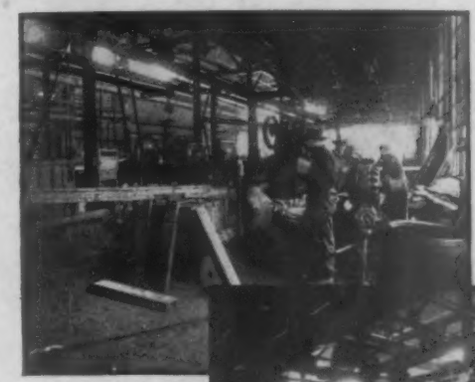
Is it necessary to ask whether concrete roads pay?

PORTLAND CEMENT ASSOCIATION

ATLANTA	DETROIT	MILWAUKEE	PITTSBURGH
CHICAGO	HELENA	MINNEAPOLIS	SALT LAKE CITY
DENVER	INDIANAPOLIS	NEW YORK	SEATTLE
DALLAS	KANSAS CITY	PARKERSBURG	WASHINGTON

Concrete for Permanence

HALL FRAMES ARE STURDY



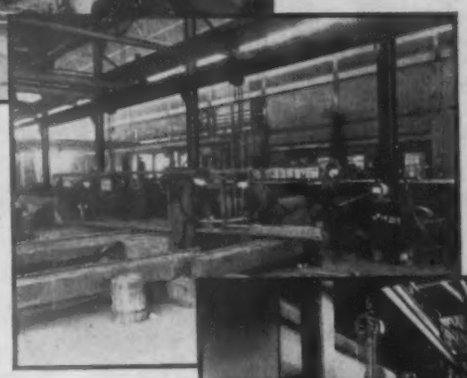
Cut-off saw mitres ends of frame members, making very strong flush joint.

HERE are unusual photographs of the foundation for a sturdy motor truck. These are taken at the plant of Lewis-Hall Iron Works.

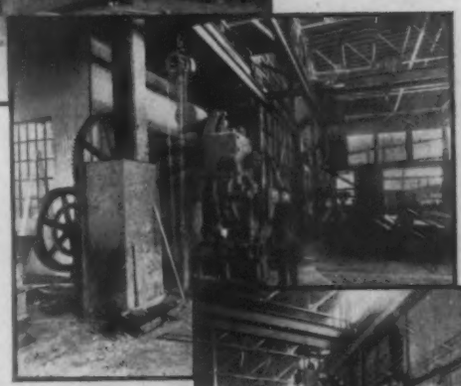
The Lewis-Hall people are one of the very few truck manufacturers who make their own chassis-frame assemblies complete.

Hall frames offer a greater factor of safety than do any others. Their firm unyielding support protects all parts from twist and strain. They stand between power plant and injury—where less sturdily-built frames fail. The strength and durability of any motor truck is directly dependent upon the sturdiness of the frame.

One of the large shears cutting Hall frame members.



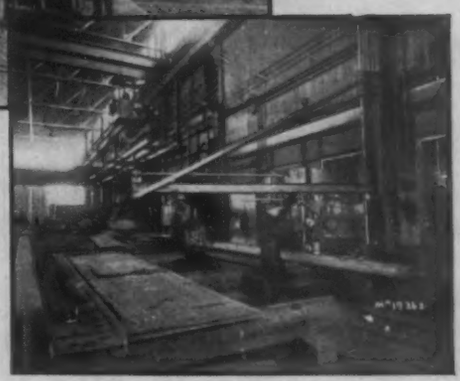
All rivets in massive Hall frame are driven hot. Hand-made means "Quality."



Showing combined punch and tapering machine. Forms and punches gussets and small frame parts.

The greater factor of safety in Hall frames is guaranteed, because they are made in the Lewis-Hall plant. Here, under close supervision, extra size in design and extra care in assembling is assured. Therefore, complete Hall truck construction has this strong foundation.

Because of strength and size any Hall truck can be converted into a dependable road tractor by simply attaching a drag hook.



Large radial drills which drill side members and main frame parts.

HAUL IN A HALL

HALL MOTOR TRUCKS

We Want Dealers With "Punch" to Sell These Enduring Trucks

Are You the Man?

HALL TRUCKS are built to stand hard work. They are designed for, and show, super-strength. They are earnest, consistent, uncomplaining road laborers. Put them on the job and they will "be on the job all the time."

Perhaps nowhere in the truck field can a truck model be found that offers such a generous amount of money-making service value—not one with so small an amount of upkeep cost.

The endurance lies primarily in the Hall-made frame—and then in the selection of stress-defying parts. The power is great enough for every emergency, with plenty to spare.

Hall Dealers have the same mental aggressiveness of the trucks. They sell Hall Trucks to owners who are hard truck masters. It is a "Steel and Concrete" proposition all the way through.

If you are "big" enough to sell the Hall line, we will give you the true enthusiasm and the "Hall Type" of remuneration. Write.

THE BUSINESS-BUILDING LINE—2 Ton and 3½ Ton, 5 Ton, 5-7 Ton

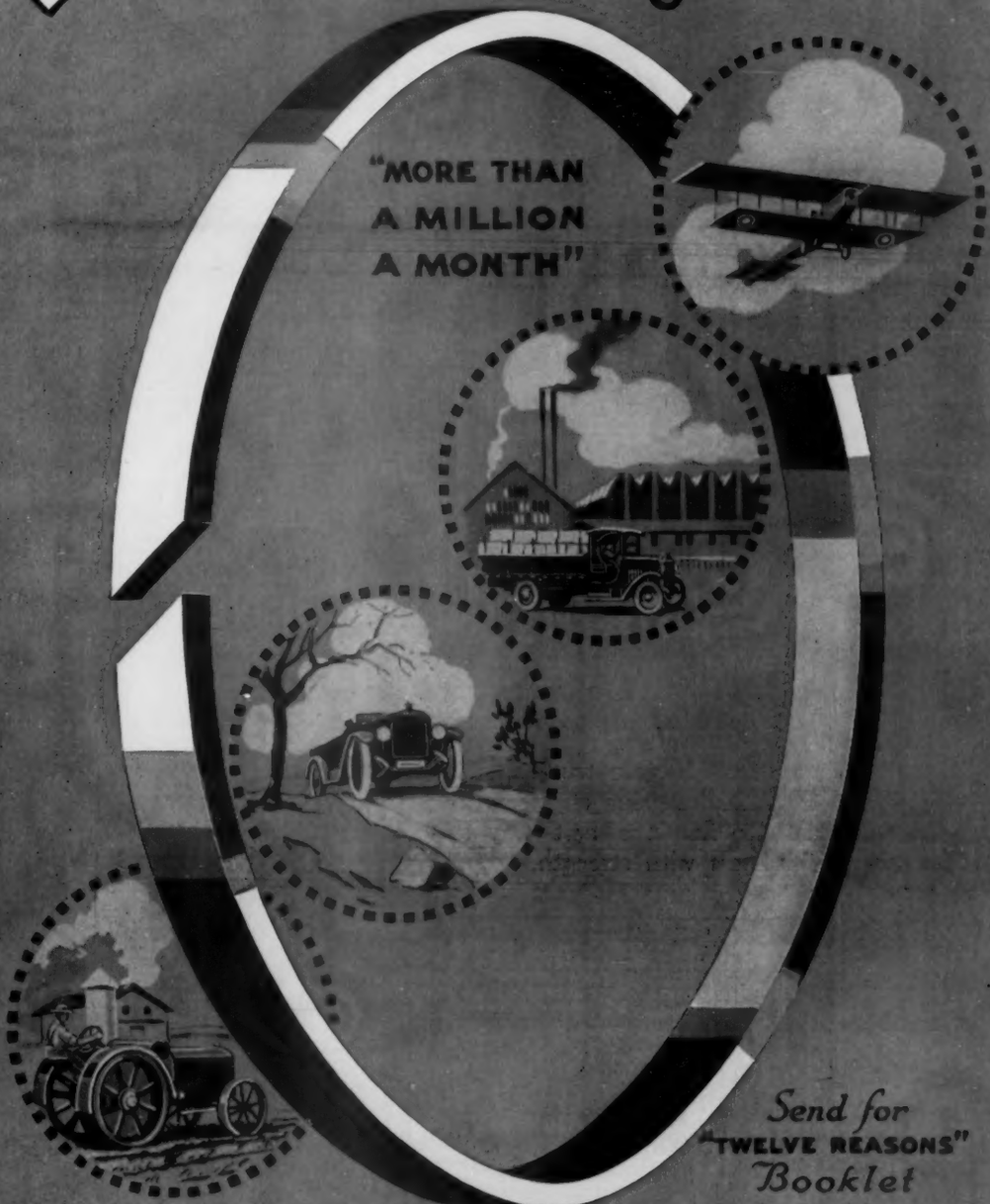
The Lewis-Hall Iron Works

Manufacturers of the HALL Truck (Established 1873)

Ferry Avenue and Grand Trunk Ry. **Detroit, Michigan**

HALL MOTOR TRUCKS

QUALITY SNAP RINGS Play a Prominent Part in America's Gas Engine Construction



Send for
"TWELVE REASONS"
Booklet

THE Piston RING COMPANY
SPECIALISTS IN PISTON RINGS

106 SANFORD ST. MUSKEGON, MICH.

"The BOSSERT Way" for Strength and Lightness

DON'T make the buyers of your trucks pay a continuous toll for the privilege of hauling unnecessary weight in the truck itself. If you do, your truck will soon get a reputation as a gasoline-eater that will be detrimental to sales.

There are many places where you can lighten the weight without sacrificing a particle of strength, simply by using Bossert Pressed Steel Parts. There are over 200 of them, a number of which you could doubtless use to advantage.

If your truck is heavier than it need be, let your engineers consult with ours to find the best way to combine lightness with strength.

The Bossert Corporation
UTICA, NEW YORK

BOSSERT Pressed Steel Parts

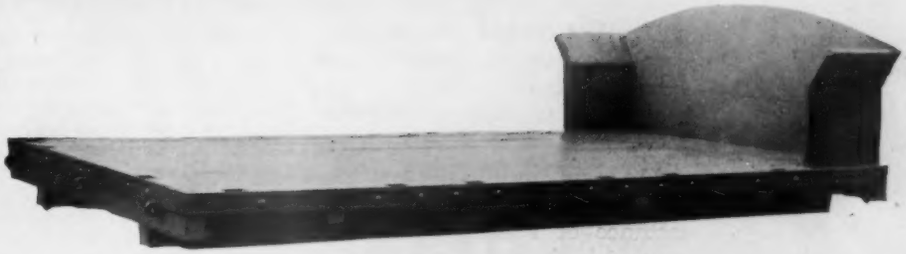
Simplex Four-In-One Combination Body

In the Four-In-One we offer a body that meets with instant favor because it combines four different types of bodies in one—dump, express, platform and stake—and thus meets almost every possible requirement or combination of them at the very minimum of cost.

The body and hoist complete weighs but little more than an ordinary express body, and the price is only a little higher, while the utility is far greater—hence the rapid sales.

Here is the Four-In-One as an express body. It has just as much room as the ordinary express body, the end gate hinging from the bottom for express use.

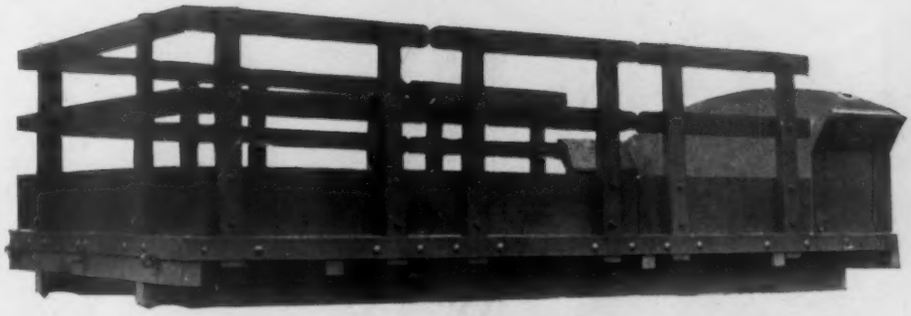
If a platform body is needed, the transformation is easily and quickly made by one man.



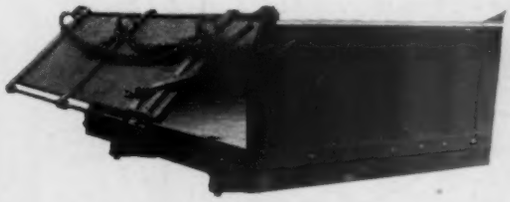
The sides of the body are removed, leaving this wide platform body ready for use.

If a stake body is desired, a set of stakes is quickly inserted in the platform body, and here you have a dandy stake body.

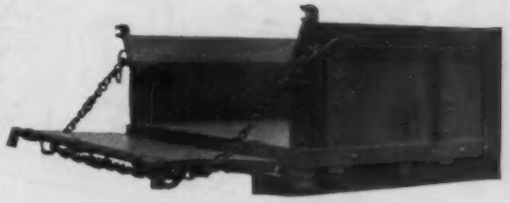
In addition to this convertible convenience there is our great hoist, occupying only 9 inches, giving a splendid dump body which can unload in forty seconds.



The Four-In-One Combination Body is a winner in every respect, meeting a strong demand, giving great value for the money and, consequently, is easily sold. We want to connect with live body-building concerns to handle our product in several territories still open. Write about it.

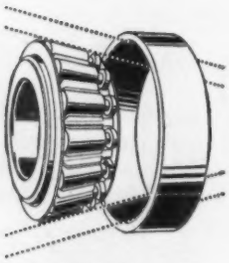


These illustrations show our exclusive two-way end gate which meets the requirements of both dump and express bodies.



The Simplex Mfg. Company, Conneautville, Pa.

TIMKEN TAPER



Dotted lines show how the inside of the "cup" of a Timken Bearing is *tapered* to fit over the *tapered* rollers.

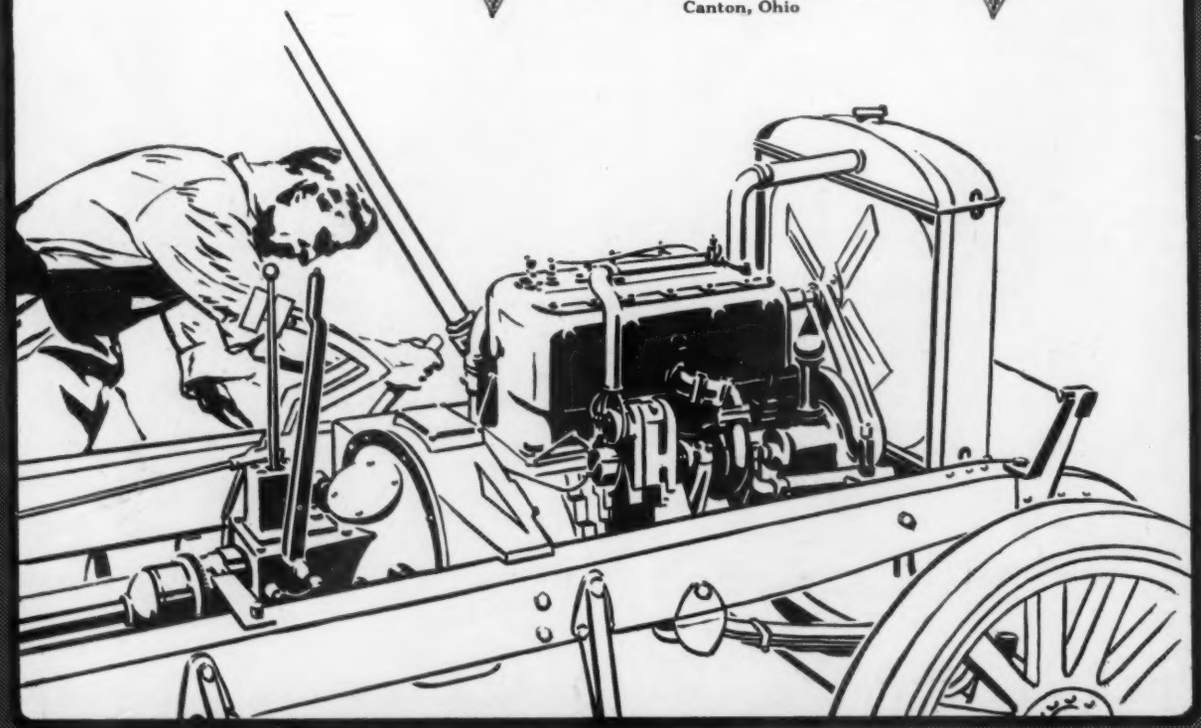
Why it Means a Well Built Truck

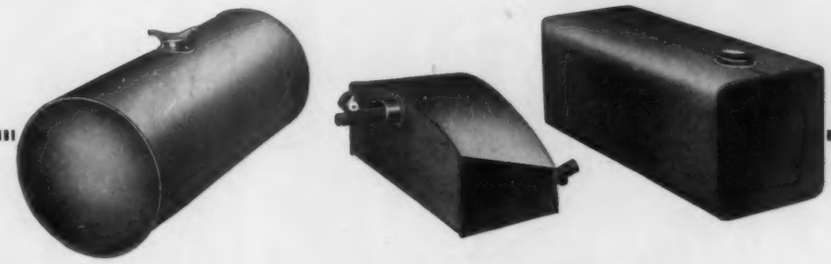
When you find Timken Bearings in a truck it's a pretty safe indication the truck is well built. The bearings cost the manufacturer more than other makes but he was glad to pay more because he knew these bearings would go far towards making the truck give you good service.

If a manufacturer displays his good faith and sincerity in the instance of bearings, you feel assured he has shown the same desire to please his customers in his selection of the rest of the car's equipment. He has purchased the very best that the market affords.

As proof of this, just put down the names of the ten best known trucks that you think of. Or take twenty, or fifty, or as many as you can remember. Check up these names with the list included in "The Companies Timken Keeps"—a booklet we will send on request—and you will find the big majority are equipped with Timken Bearings at those points that receive severe service.

THE TIMKEN ROLLER BEARING COMPANY
Canton, Ohio





Our abundant facilities, expert operators and long years of experience in sheet-metal work combine to give truck, tractor and passenger car makers unusual service in quality products, reasonable prices and quick deliveries.

A. B. & B. soldered and welded fuel tanks have made a reputation for durability and strength which the roughest treatment cannot discount.

COMPARTMENT TANKS

These tanks are guaranteed leak-proof and so give the trucks and tractors they equip immunity from service repairs, loss of time and consequent annoyance.

HOODS SHEET METAL FENDERS

Battery and tool boxes, mufflers, runningboard shields, pans, and all other sheet-metal parts used in automotive construction will be quickly built here over your specifications.

Our large plant, with its equipment of lathes, drill and punch presses, grinders and turret lathes will handle your emergency and other work expeditiously.

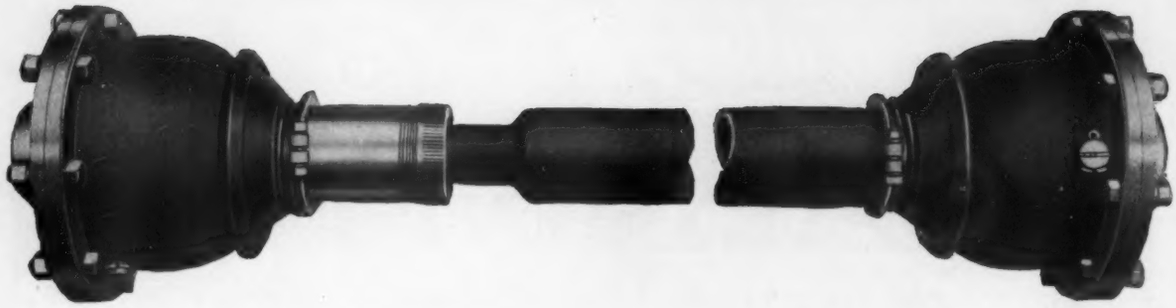
Send blueprints and specifications for estimates. Samples of stock forwarded promptly.

A. B. & B. Specialty Co.

3300 Fond Du Lac Avenue

Milwaukee, Wisconsin

Spicer Universal Joints



Universally Accepted as the Most Dependable Flexible Connection Known to Motor Car Practice

Grease-Tight Dust-Proof

PARTS INTERCHANGEABLE

Spicer Mfg. Corporation

South Plainfield, N. J.

Sales Representatives:

L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit
A. H. Coates, 41 Spear Street, San Francisco, Cal.
Foreign: Benjamin Whittaker, 21 State Street, New York

No other winch of the same power is so compact and low priced as the—

MEAD-MORRISON
Vertical Capstan Winch

This winch is very compact, occupying but a small space back of the driver's seat—less than any other winch of similar type. It is very strong, powerful and durable, and is **equipped with an automatic brake** which positively prevents backward turning of the winch head, should the driving chain break.

It saves so much time, labor and expense in handling and hoisting heavy articles that it should be a part of the equipment of every heavy-duty truck. Its presence there will help sell the truck to buyers seeking a quick, practical and economical way of solving their heavy-haulage problems.

Mead-Morrison Winches are made by a company having 35 years' experience in building high-grade hoisting machinery, and are fully guaranteed. Their utility and value are so great they have been adopted as standard accessories by the makers of these trucks—

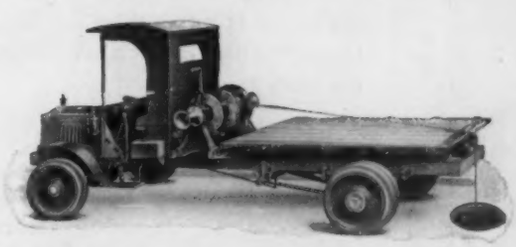
Packard
Pierce-Arrow
Republic
Service
Mack
Velie
Dart
United States
Autocar, etc.

Friction Drum Winch

This is another popular style, being particularly adapted for telephone and cable companies, for handling heavy machinery and all wire rope work.

We also make a Horizontal Underslung Double Winch which leaves the platform clear. It is very powerful and particularly adapted for use in dump bodies.

Our pamphlet 121-B gives full details. Write for it.



MEAD-MORRISON MANUFACTURING CO.

NEW YORK: Singer Building **BOSTON** **CHICAGO: Monadnock Block**

REO

Eventually —But Not Now!

We cannot say in truth that the Reo Motor Car Company needs any more dealers at this time.

You know the conditions so well, 'twere a waste of space to explain that at this time Reo is suffering mainly from a tremendous over-demand.

Of course over-demand is the normal condition with Reo.

The Reo dealer's plaint is always, "If only I could get enough Reos." Aggravating that, from the dealer's standpoint as well as from ours.

But mighty satisfactory in the long run!

A lot of makers would like to change places with Reo!

And a lot of dealers who have to force every sale, are looking forward to the time when they may secure the line that sells itself and stays sold.

That's Reo—of course!

We have some plans that will relieve conditions in the near future.

And so we are ready to entertain proposals from the right kind of dealers in territory where Reo is not now properly represented.

Dealers who appreciate the tremendous possibilities in Motor Trucks as well as passenger cars given preference.

All correspondence held strictly confidential.

Better get in line now.

If you wait there will be others—your own rivals—ahead of you.

Dealers who handle the Reo line are always "lucky."

Eventually every dealer hopes to handle Reos—get in line now. You never can tell just when the plum may fall.

Reo Motor Car Company
Lansing, Michigan

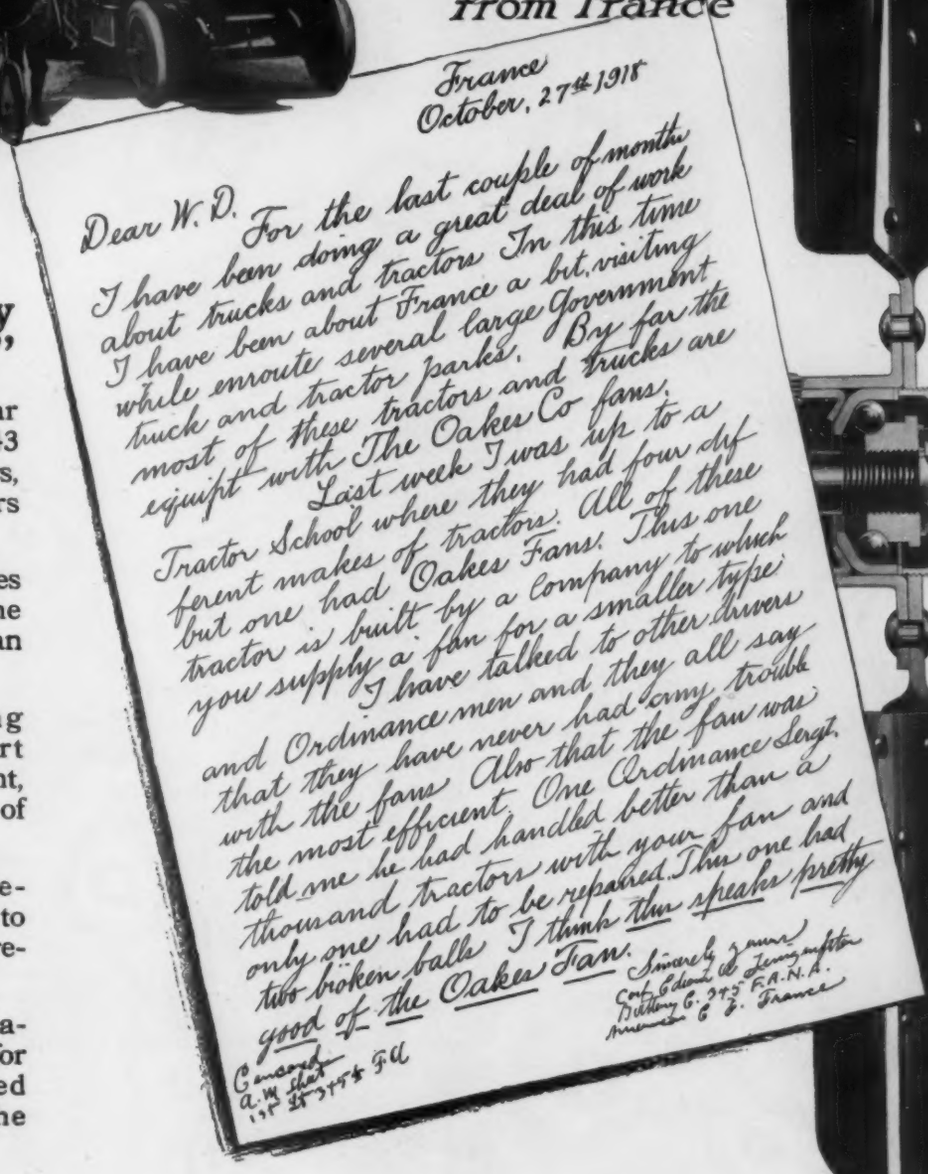
"The Gold Standard of Values"

"Over a Million Oakes Fans in Use"

OAKES EFFICIENT COOLING FANS

"this speaks pretty good of the Oakes Fan"

A Letter from France



France
October, 27th 1918

Dear W. D.

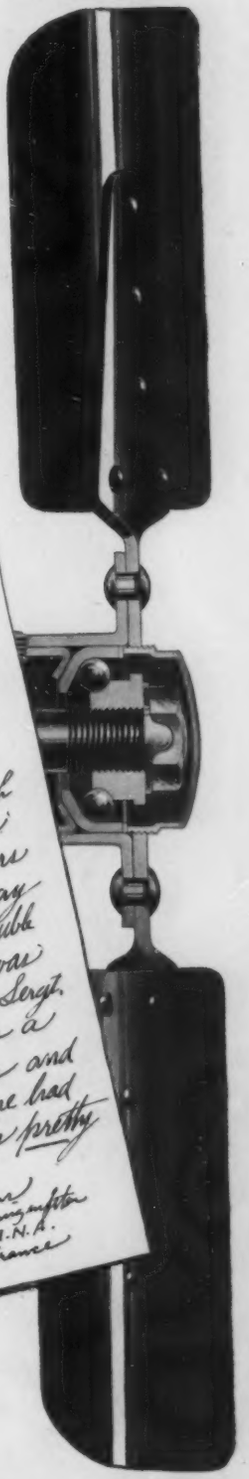
For the last couple of months I have been doing a great deal of work about trucks and tractors. In this time I have been about France a bit, visiting while enroute several large Government truck and tractor parks. By far the most of these tractors and trucks are equipt with The Oakes Co fans.

Last week I was up to a Tractor School where they had four different makes of tractors. All of these but one had Oakes Fans. This one tractor is built by a company to which you supply a fan for a smaller type.

I have talked to other drivers and Ordinance men and they all say that they have never had any trouble with the fans. Also that the fan was the most efficient. One Ordinance Sergt. told me he had handled better than a thousand tractors with your fan and only one had to be repaired. This one had two broken balls. I think this speaks pretty good of the Oakes Fan.

Sincerely yours,
Cpt. Edward C. Jennings
Battery C. 345 F.A.N.A.
American E. F. France

Censored
A. W. Shaw
1918



243 Makers Say "Quality First"

Oakes Fans are regular factory equipment on 243 of the foremost tractors, trucks, passenger cars and motors, because—

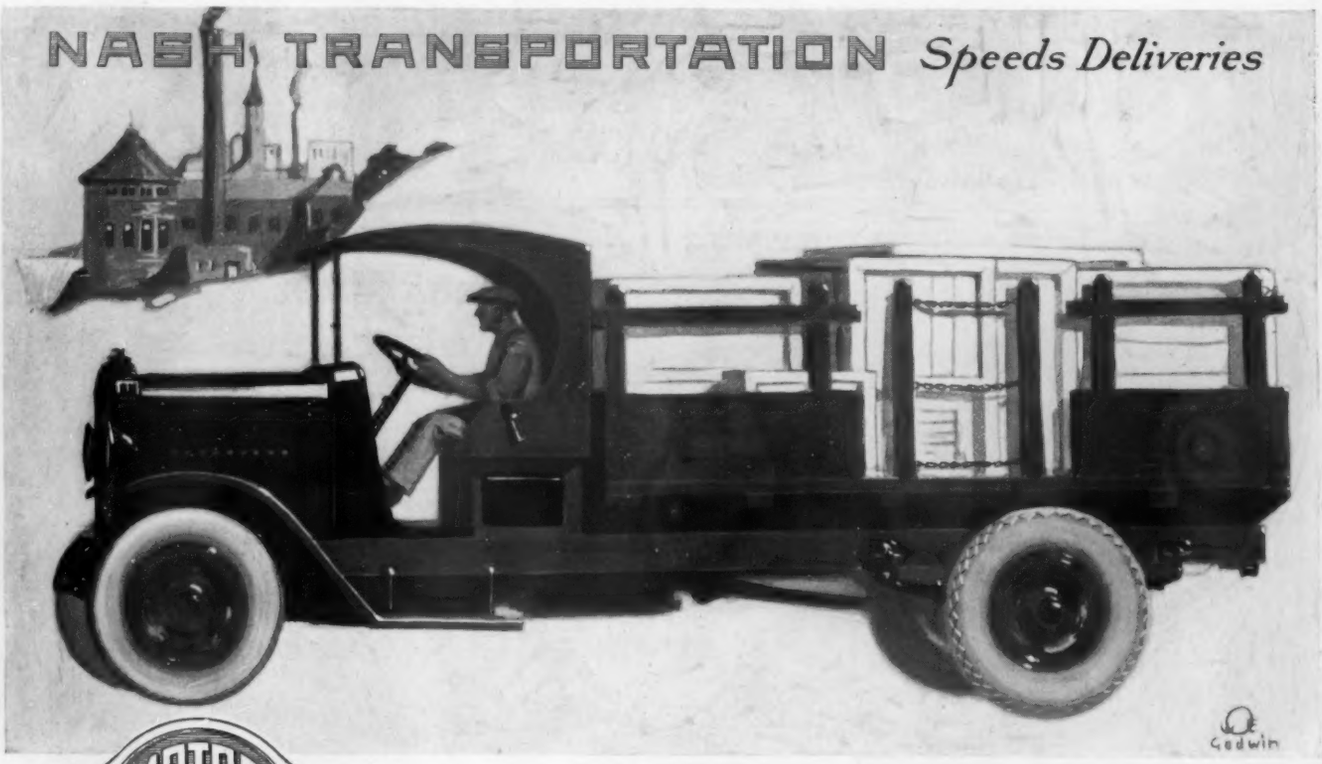
—Oakes factory facilities are the largest in the world devoted to fan building.

—Oakes engineering means prompt, expert attention and efficient, economical solution of cooling problems.

—Oakes Fans are designed and installed to meet your cooling requirements best.

—Oakes means permanent fan satisfaction for the user and added sales value for the manufacturer.

THE OAKES COMPANY INDIANAPOLIS INDIANA·U·S·A·



MOTOR NASH TRUCKS

PNEUMATIC tire equipment, as illustrated above, at slight extra cost, makes this powerful 2 ton truck particularly desirable for any business requiring rapid transportation. It is an unusually attractive investment at its price.

Quality Assured by the Name

ASSURING the high quality of Nash trucks—their ability to haul your loads at low cost day after day—is the reputation and standing in the industry of the big Nash institution itself.

The power, endurance and dependability these trucks are displaying in owner service throughout the country will convince the most careful buyer that they are uncommonly wise transportation investments.

An outstanding feature is the automatic locking differential. Loss of traction by spinning of the driving wheels is practically impossible. This enables Nash trucks to make surer and safer deliveries, regardless of road or weather conditions.

Immediate buyers can get reasonably prompt deliveries.

Nash Trucks—One-Ton Chassis $1650; Two-Ton Chassis $2175
Nash Quad Chassis $3250
Prices f.o.b. Kenosha

In addition to Nash Trucks there is a full line of Nash passenger cars with Nash perfected Valve-in-Head motor

The Nash Motors Company, Kenosha, Wisconsin
Manufacturers of Passenger Cars and Trucks, Including the Famous Nash Quad
The Nash Motors, Limited, Toronto, Ont., Distributors of Nash Cars and Trucks for the Dominion of Canada

NASH MOTORS

VALUE CARS AT VOLUME PRICES

POSITIVE TRACTION

GIANT GRIP
Traction Chains

Manufactured by **CHALLONER COMPANY** Oshkosh, Wisconsin

ESTABLISHED-1863

Adopted as Standard Equipment on U. S. Government Trucks in Motor Transport Division

Rowe

THE PIONEER
Worm Drive Trucks

Comparison of records is an easy way to sell the Rowe. It is such a highly efficient piece of mechanism that it outshines competition in its performance.

It is so well and durably constructed that it stands up to the hardest service.

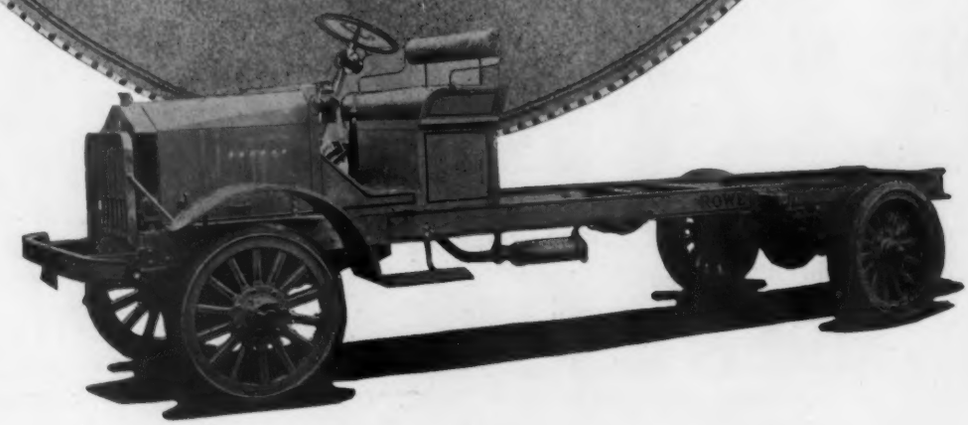
Its parts are so well balanced and co-ordinated that it is economical to operate and maintain.

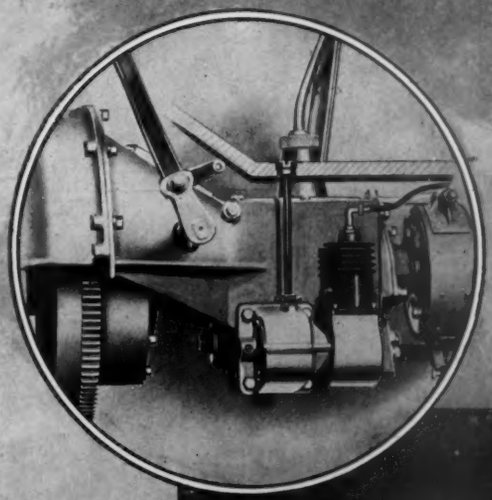
Four models—2, 2½, 3½ and 5 ton capacities meet most trucking requirements.

Good trucks, good service, good records, good reputation, good line—this is what we offer dealers.

Write, if you are interested.

Rowe Motor Mfg. Co.
Lancaster, Pa.





The Goodyear Akron-Boston Express —

With a Kellogg Pump on Every Truck

THE tremendous success of the pneumatic truck tire marks a definite and important advance in motor transportation.

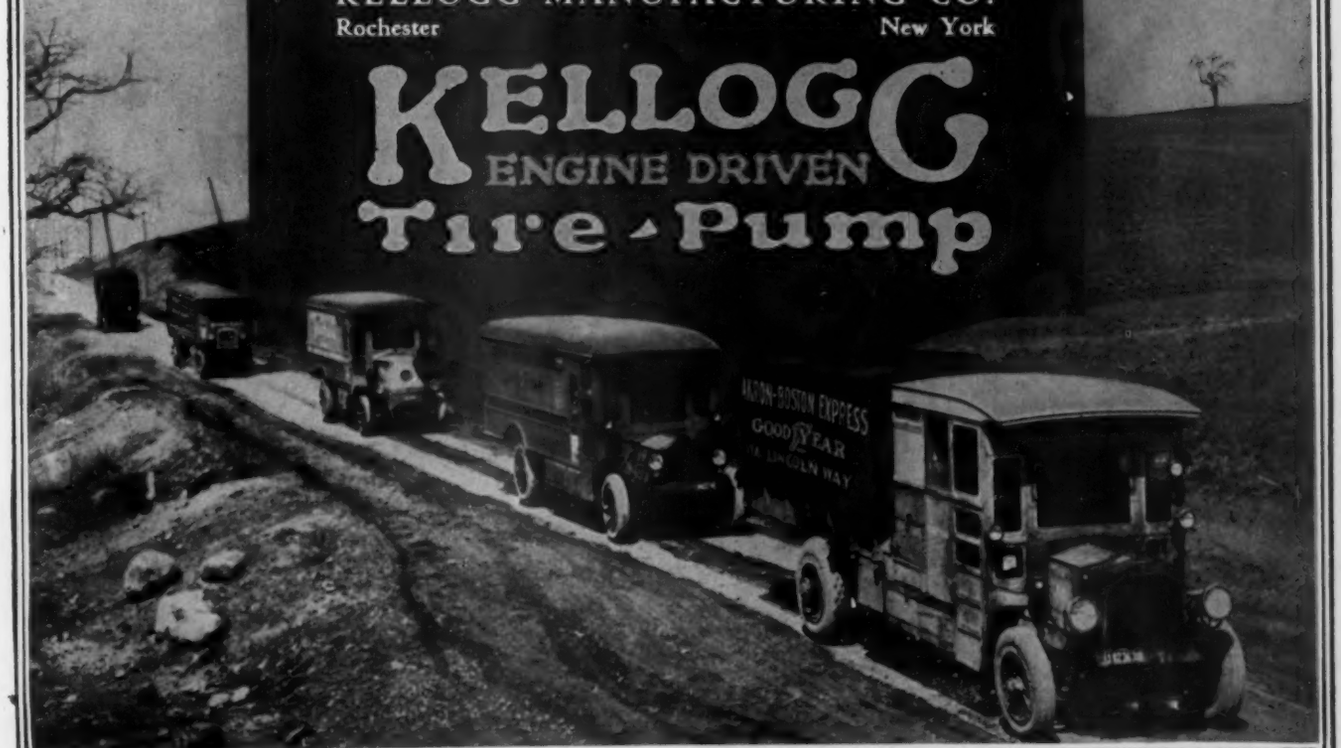
The Kellogg Engine-Driven Pump made possible the complete success of these tires. Without it they could scarcely be maintained at the air pressure necessary to deliver perfect service.

The Goodyear Company, in seeking to preserve the excellence of its giant pneumatics, used the utmost care in selecting a pump that could be depended upon to give these tires every opportunity to do their best.

That they selected the Kellogg for this service is a more convincing argument for its high quality and efficiency than anything we ourselves could possibly say.

KELLOGG MANUFACTURING CO.
Rochester New York

KELLOGG ENGINE DRIVEN Tire-Pump



TRUE TRAILER VALUE

The Quaker Maid Wholesale Grocery of Louisville, Kentucky, is among the hundreds of American business houses that are operating Fruehauf Semi-Trailers—cutting delivery costs one-half to two-thirds.

The unit shown above is one of two 8 ton Fruehauf Trailers operated with 3½ ton tractors by the Louisville company.

BECAUSE it represents true trailer value—trailer value on which buyers can depend—the Fruehauf Semi-Trailer has secured the confidence of distributors and dealers everywhere.

The Fruehauf Semi-Trailer is not a make-shift unit—but represents sound engineering principles. Built to give long service by a company with 25 years' manufacturing experience, the first Fruehauf Semi-Trailer is still in operation.

Every unit that bears the Fruehauf name is built to stand up under severe haulage conditions—to carry the bulk of the load and reduce transportation costs.

And because the Fruehauf unit does give dependable service, 2 ton trucks haul 6 ton loads; 3½ ton trucks 10 ton loads, when operated in connection with Fruehauf Semi-Trailers.

****

The Fruehauf distributorship offers a most unusual opportunity for building a profitable and permanent business. This fact has been definitely established during the last few years.

And with increased production, we are in position to negotiate with a few responsible, aggressive distributors in open territory. Write for details.

FRUEHAUF TRAILER COMPANY

1302 Gratiot Ave. Detroit, Michigan

FRUEHAUF TRAILERS

Window-Transparency Dealer's Help No. 5 *Size Chart Dealer's Help No. 15*

How to sell more brake lining

What these signs and display racks will do for you

RIGHT in your town today there are motorists who need new brake lining on their cars. The big Thermoid National Advertising Campaign has convinced them of the danger of inefficient brakes. If they know you are a Thermoid dealer, the business will come to you. It will give you a chance to put new customers on your books.

Don't allow any of these sales to get away. Use the signs, display racks, etc., shown on this page, and tie up your store with the Thermoid national advertising.

The big ***transparent window sign*** shown in the above picture lets every motorist who goes by know that you sell Thermoid. The size chart gives the sizes and amounts of brake lining needed on all the leading passenger cars and trucks.

The attractive cabinet No. 9 displays Thermoid Brake Lining effectively to everyone who comes to the store, and is a great convenience in cutting the exact length of lining required.

The ***tag*** 7-A has been a great convenience to garagemen and a splendid business getter. Be certain to get a supply of these. Use the Thermoid ***printed circular*** No. 8 to enclose with the bills, or distribute over the counter.

The "Brakes Inspected" ***sticker*** should be on the windshield of every one of your customers' cars.

You should also have the ***long window trim,*** which shows how quickly a car should stop if the brakes are right.

Every one of these will help build profitable business. Simply ask your jobber, or write us direct. Get the full benefit from the demand for Thermoid by using these dealer helps.

Every foot of Thermoid is backed by ***Our Guarantee: Thermoid will make good —or WE WILL.***

Thermoid Rubber Company

Factory and Main Offices: Trenton, N. J.

New York Chicago San Francisco Detroit Los Angeles Philadelphia Pittsburgh Boston London Paris Turin

Canadian Distributors:

The Canadian Fairbanks-Morse Company, Limited Montreal

Branches in all principal Canadian cities

Makers of "Thermoid Crolide Compound Tires" and "Thermoid-Hardy Universal Joints"

Display Cabinet Dealer's Help No. 9

Repair Tag Dealer's Help No. 7-A

Illustrated Price Lists Dealer's Help No. 8

Sticker for Windshield Dealer's Help No. 6-A

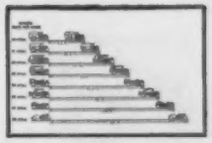
Window Streamer, 6 inches by 36 inches, Dealer's Help No. 4

Sticker

Have your brakes been inspected?

LET US INSPECT your brakes and make certain they are safe. The security of your car and its occupants depends on good brakes.

THIS CHART at the side shows how quickly your car should stop if the brakes are right.



Put this sticker on your windshield

Do it today

Join the brake inspection movement

Will your car do this?

Stan-Par

Truck Axles

are designed to accommodate ***any Torque*** that will ***slip the wheels***—no matter ***how large the engine,*** how ***low*** the ***total gear reduction*** or ***what type*** of ***differential*** is used.

This permits the truck designer to employ a 4-speed transmission with extremely low ratio on first speed and reverse.

The value of this Stan-Par design should immediately appeal to every progressive truck manufacturer, as it makes possible ***great ability on low gear*** without using such a large engine that economy is sacrificed on high gear.

Stan-Par

Passenger Car Axles

also contain many new features of great technical and practical value. All Stan-Par Axles are ***equipped throughout with Bock bearings.***

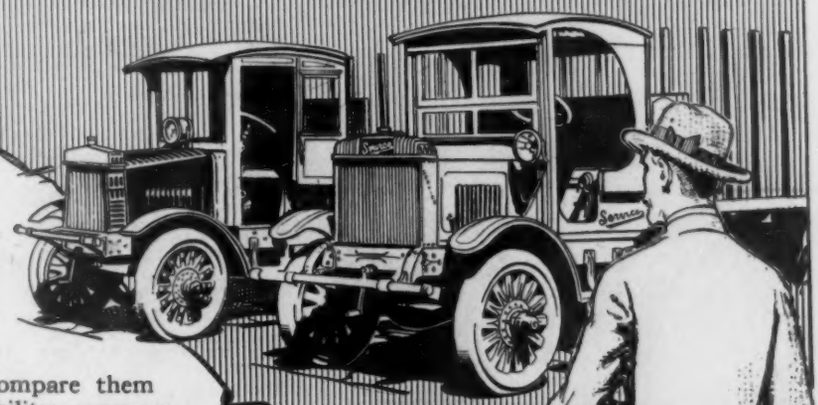
THE

STANDARD PARTS

COMPANY

General Offices Cleveland, Ohio

COMPARE



BEFORE you make your decision on a motor truck agency, make thoughtful comparisons. Compare Service Trucks, point by point, with any other truck you think of selling. Compare them in power, strength, dependability, economy of operation and proven value. Look into the re-sale records.

Service Motor Trucks have gained their present dominant position thru sheer merit. They have established a wonderful record of re-sales, 68% of the 1918 output being sold to satisfied users. The average for several years is over 65%. This is, in itself, a valuable asset to the Service dealer, for future business is certain.

With the ever-growing demand being still further expanded by powerful National and International advertising, and with prompt deliveries assured by a great increase in factory capacity, Service dealers have every advantage in getting a generous share of motor truck sales.

Service Trucks are built in 5 models, from 1 to 5 tons capacity, all models having the unequaled worm drive operating in a bath of oil. Write today for catalog and dealer proposition, naming territory desired

SERVICE MOTOR TRUCK CO., Wabash, Indiana, U. S. A.

New York
87-89 West End Ave.

Chicago
2617-25 So. Wabash Ave.

Service MOTOR TRUCKS

Garco Brake Lining stops the car, but advertisements like this in the biggest and best automobile trade publications in the field certainly start the big brake lining business coming to Garco Jobbers. Look for this advertisement in the March issues.

Here's What Stops Your Car

THINK what depends on the lining in your brakes when the speedometer shows 40 an hour, or more, and you've got to stop QUICK. Think of the terrific heat that's generated in the brakes as you slide to 25, and on down to dead stop.

Think of the times you use your brakes in a single mile of crowded traffic—what it means if they don't hold on a hill.

The difference between good brake lining and cheap is only a few cents per foot. But that difference means life or death when the big emergency comes. That's why we build Garco Brake Lining up to the highest standard of quality, and use the best materials and the best workmanship that can be found.

Don't risk your reputation, the lives of your customers, by using cheap, inferior linings. Back your good workmanship with Garco. Ask your jobber to supply you. If he doesn't have it in stock, write us direct. We will give you the name of the nearest distributor—give you details of a sales proposition that is a year-'round money maker.

Garco Asbestos Products

Packings

Locomotive Throttle and Air Pump Packings
High Pressure Piston Packings
Valve Stem Packing
Medium and Low Pressure Packings
Perfect Valve Rings
Flax Packings
High, Low and Medium Pressure Sheet Packings
Gasket and Gasketting Material
Asbestos Wick and Rope

Asbestos Automobile Specialties

Brake Lining
Transmission Lining for Fords
Cone Clutch and Disc Clutch Facings
Asbestos Spark Plug Yarn

Asbestos Textiles

Cloth — Carded Fibre
Yarn
Cord — Braided Tubing

General Asbestos & Rubber Co.

Main Office and Factories: Charleston, S. C.
Branches and Complete Stocks: 58 Warren St., New York; 106 W. Lake St., Chicago
311 Water St., Pittsburgh
Largest Manufacturers of Asbestos Textile Products in the World

GARCO

ASBESTOS PRODUCTS—BRAKE LINING—PACKINGS—TEXTILES

Traffic Truck

4,000 LBS. CAPACITY

$1395

"Nailing" Fast a Fact

We are often asked the question: "How can you produce a quality truck of 4,000 pounds capacity for the low price of $1395?"

Because, we confine the operation of our entire plant to the building of a truck of one design and capacity, which makes quantity production possible.

And, the **lowest priced 4,000 pound capacity truck in the world,** built of standard units, is the result.

We are producing a Traffic every 45 minutes. The Traffic specifications emphatically "nail" fast the fact that the Traffic is the greatest truck offering in the world today, and Traffic performance clinches it. It is without a single competitor.

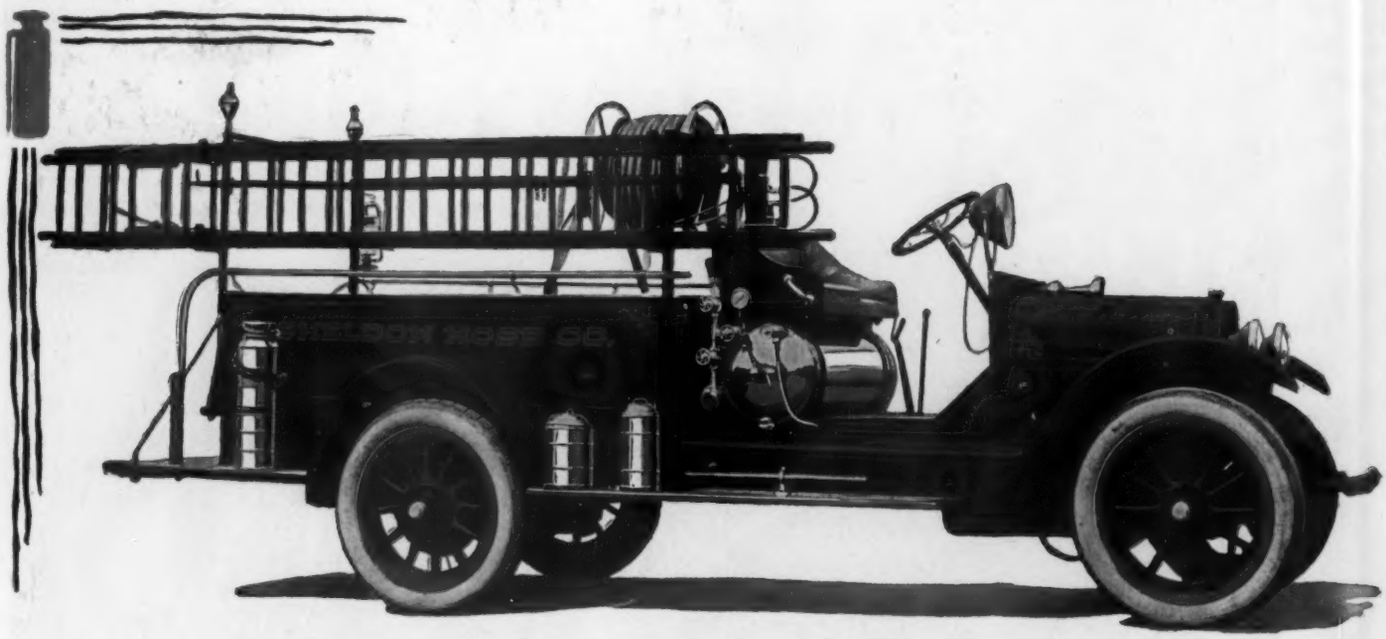
We want a dealer in every city, town and village in America. Wire today for territory. Tomorrow may be too late. Do it now. Better still—come to St. Louis—see the Traffic produced at the plant, and see it perform.

Chassis, $1395, f.o.b. St. Louis

Traffic Specifications

4-cylinder, valve-in-head, 40 h.p. motor; Covert transmission; Borg & Beck disc clutch; Kingston magneto, with impulse starter; 4-piece cast shell cellular type radiator; drop forged front axle, with Timken roller bearings; Russel rear axle, internal gear, roller bearings; semi-elliptic front and rear springs; 6-inch U-channel frame; Standard Fisk tires; 133-inch wheelbase; 122-inch length of frame behind driver's seat; oil cup lubricating system; chassis painted, striped and varnished; driver's seat and cushion regular equipment.

Traffic Motor Truck Corporation
3807-19 Laclede Avenue St. Louis, Mo.



SPECIFICATIONS

Single Tank Combination Chemical and Hose Car

HOSE BODY—Steel with slatted wood bottom ventilating type, 1000 foot capacity.

STEP ACROSS REAR—With Tool Box.

RUNNING BOARDS—One on each side, between front and rear fenders.

HAND RAILS—One on each side, running length of body and down at rear.

SEAT—Roomy and comfortable, Standard Fire Apparatus Type.

REAR FENDERS—Especially made to fit between side and rear Running Boards.

*CHEMICAL TANK—35-gallon size. Tank is complete with Acid Receptacle, Piping, Pressure Gauge, Filling Connection and Suitable Brackets for mounting.

*EXTRA ACID RECEPTACLE—Mounted in Holder on Running Board.

*SODA BAG—Mounted in Canister on Running Board.

*AUTOMATIC REEL or Perforated Steel Basket—for Chemical Hose, Capacity 250 feet.

*CHEMICAL HOSE—150 feet of ¾ inch best grade, 4-ply, coupled in 50 foot lengths.

*CHEMICAL NOZZLE—Brass shut-off.

*CHEMICAL CHARGES—Two (2) for 35-gallon tank.

EXTENSION LADDER—24 foot Rapid-hoist, mounted in Brackets at side of body.

ROOF LADDER—12 foot with Folding Hooks, mounted in Brackets at side of body.

LANTERNS—Two (2) Dietz Fire Department Type, mounted in Suitable Holders.

TORCHES—Two (2) mounted at rear of body.

BELL—Locomotive Type, suitably mounted.

EXTINGUISHERS—Two (2) Copper Fire Department Type, 3-gallon size, with carrying straps and shut-off nozzles, mounted in Holders on Running Boards.

AXE—Fire Department Type, mounted in Holders.

CROWBAR—Mounted in Holders on Running Board.

PIKE POLE—Mounted at side of body in Holders.

PLAY PIPE HOLDERS—Two (2) mounted on rear step.

CHEMICAL CHARGES—Two (2) for 3-gallon Extinguishers.

Double Tank Combination Chemical and Hose Car

Includes all items shown above, with the following additional:

CHEMICAL TANK—One (1) additional.

PIPING—Set of Double Tank Piping instead of Single Tank Piping.

PRESSURE GAUGE—One (1) additional.

ACID RECEPTACLE—One (1) additional mounted in Holder.

SODA BAG—One (1) additional, mounted in Canister.

*Hose Car Without Chemical Tank

Same specifications as Single Tank Combination, except that items marked (*) are not included.

PRICE LIST

SINGLE TANK COMBINATION EQUIPMENT COMPLETE

WITH COPPER CHEMICAL TANK:

Style SCC-1, Black Enamel Fittings	$1450
Style SCC-2, Polished Brass Fittings	1500
Style SCC-3, Nickel Tank and Fittings	1590

WITH STEEL CHEMICAL TANK

Style SSC-1, Black Enamel Fittings	$1375
Style SSC-2, Polished Brass Fittings	1425
Style SSC-3, Nickel-Plated Fittings	1475

The above prices are for complete equipment, primed, crated, not mounted on chassis

EQUIPMENT MOUNTED ON CUSTOMER'S CHASSIS, Entire apparatus painted, striped, lettered (gold leaf), price additional ..... $ 300

DOUBLE TANK COMBINATION EQUIPMENT COMPLETE

WITH COPPER CHEMICAL TANKS:

Style DCC-1, Black Enamel Fittings	$1885
Style DCC-2, Polished Brass Fittings	1935
Style DCC-3, Nickel Tanks and Fittings	2060

WITH STEEL CHEMICAL TANKS:

Style DSC-1, Black Enamel Fittings	$1735
Style DSC-2, Polished Brass Fittings	1785
Style DSC-3, Nickel-Plated Fittings	1835

The above prices are for complete equipment, primed, crated, not mounted on chassis

EQUIPMENT MOUNTED ON CUSTOMER'S CHASSIS, Entire apparatus painted, striped, lettered (gold leaf), price additional ..... $ 325

HOSE CAR WITHOUT CHEMICAL TANK

Style H-1, Black Enamel Fittings	$ 825
Style H-2, Polished Brass Fittings	875
Style H-3, Nickel-Plated Fittings	965

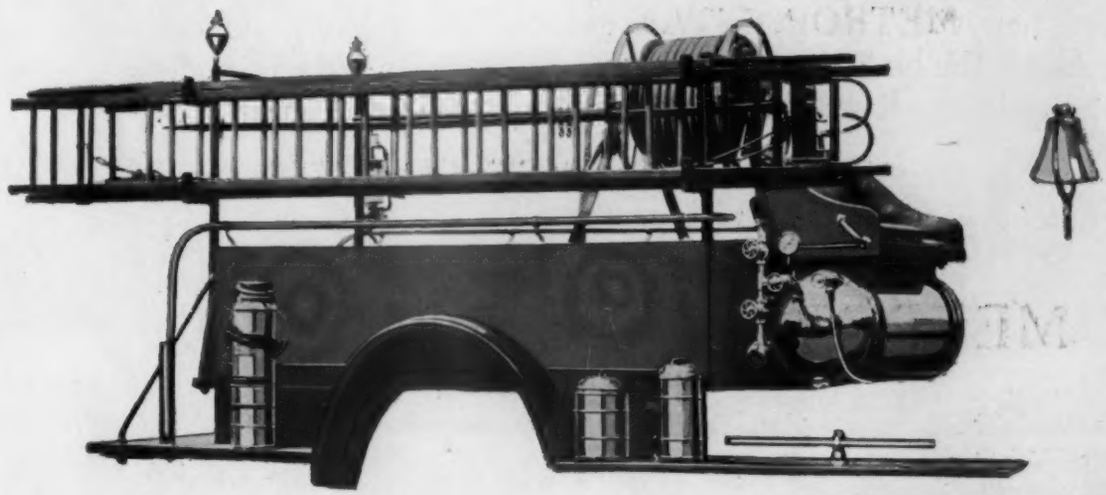
The above prices are for complete equipment, primed, crated, not mounted on chassis

EQUIPMENT MOUNTED ON CUSTOMER'S CHASSIS, Entire apparatus painted, striped, lettered (gold leaf), price additional ..... $ 275

All Prices F.O.B. Utica

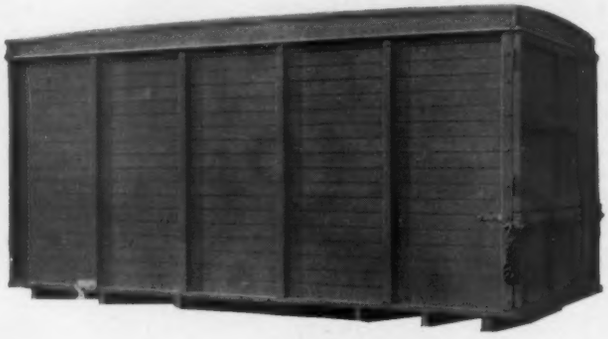
Write for Truck Dealers' Discount

O. J. Childs Company - - - Utica, N.Y.



METROPOLITAN
Standard Truck Bodies

TWENTY STYLES IMMEDIATE DELIVERY



The body shown above is our style No. 28. It is 14 feet long, 7 feet wide and 6 feet 6 inches high, outside dimensions. Tail gate in rear with double doors above.

This is an ideal body for long-distance hauling, or for any purpose where absolute protection of the load is required.

It can be knocked down for shipment and easily assembled when mounted.

The new METROPOLITAN catalog is a valuable reference book on the body question. Every truck dealer should have one on his desk. It will be mailed on request.

Three distributing points make METROPOLITAN service available over a wide territory.

METROPOLITAN BODY CO.

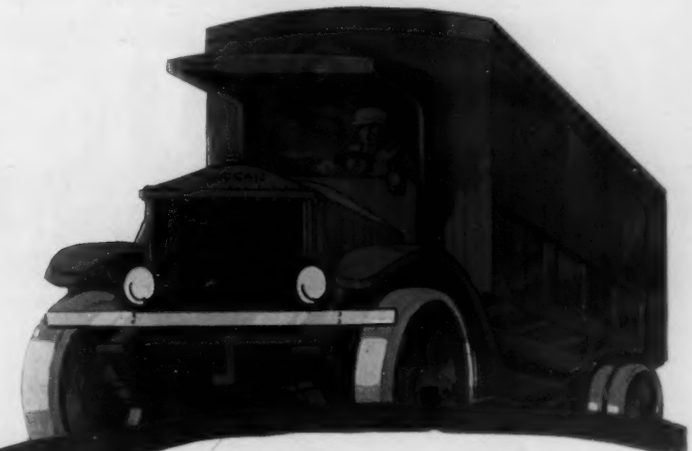
(Home Office and Factory)

NEW YORK CITY
246 West 65th St.

BRIDGEPORT, CONN.
430 Grand Street

BOSTON, MASS.
194 Brighton Ave.

Suppose You Were BUYING Trucks



If you, Mr. Distributor, were a purchaser—instead of a seller—wouldn't you be impressed by a salesman who could say, "This truck is carefully made of the best parts obtainable in one of the most modern and completely equipped factories? It has all that any truck can claim and, in addition, it has five distinct points of difference and superiority:

"1. Larger frame and castings than in any truck of the same capacity—

2. Larger motor than in any truck of the same capacity—

3. Torque rods which take the strain from the springs—

4. Demountable power plant that can be changed in 30 minutes—

5. The severest pre-shipment test possible —long road runs on mountain roads."

If you, Mr. Distributor, feel that, as a truck buyer, you would be impressed by the facts briefly outlined above, then, as a truck distributor, you **know** that Maccar is the truck you want to sell.

We can supply a few more distributors.
We invite you to write us now

NOTE THESE SPECIFICATIONS

Motor	Continental	Frame (Heat Treated)	Parish
Ignition	Bosch	Axles and Bearings	Timken
Carburetor	Stromberg	Drive	Worm
Transmission	Brown-Lipe	Steering Gear	Ross

1½, 2½, 3½ and 5½ Ton Capacities

Maccar Truck Co.
Scranton, Pa.

Maccar's Demountable Power Plant can be changed in 30 minutes.

"the truck of continuous service"

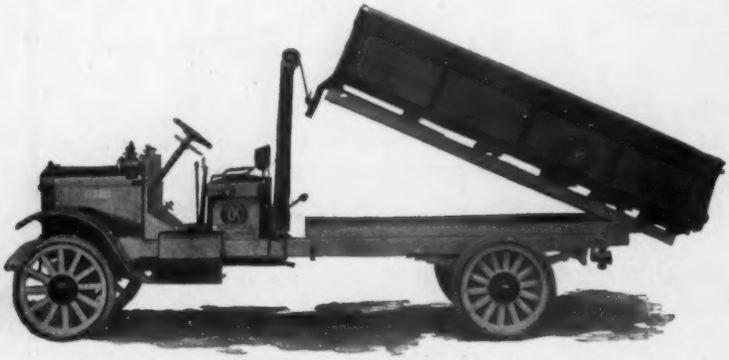
Maccar

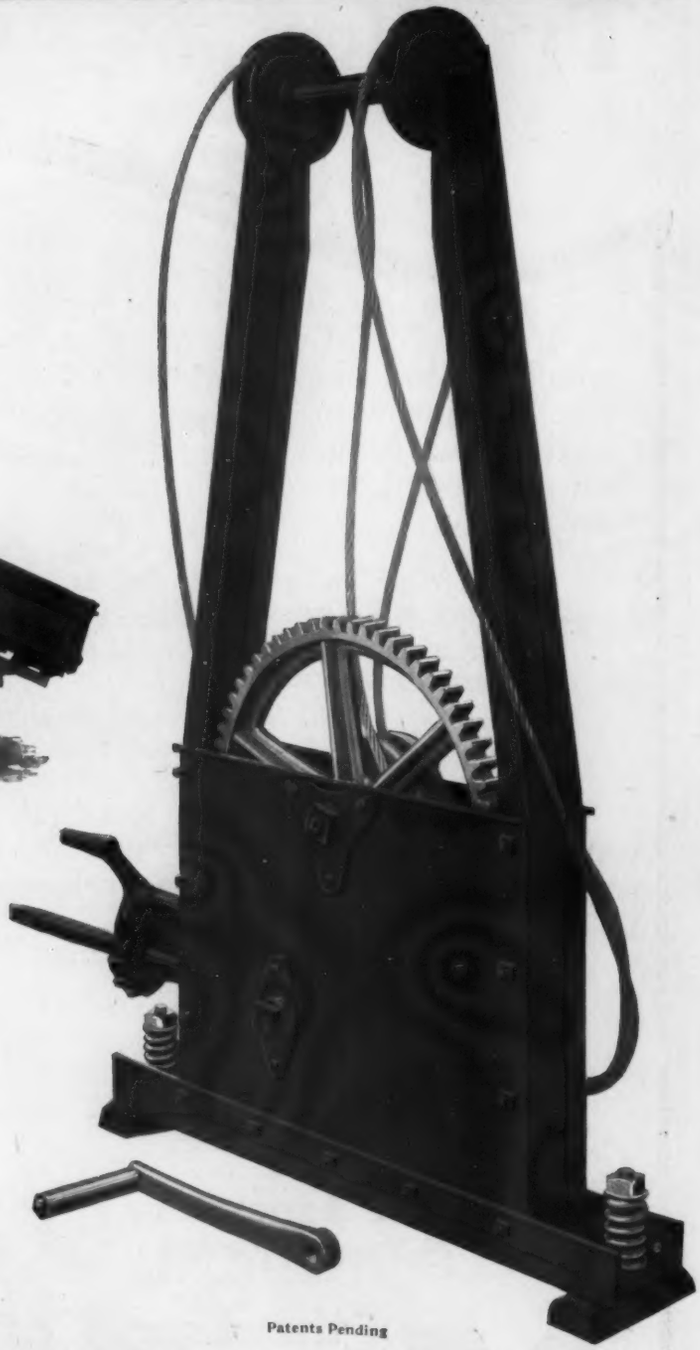
COLUMBIAN
HAND HOIST FOR DUMP BODIES

100% Efficient

For every truck, for every purpose where dump bodies are an economical requirement, this hand hoist is the most powerful and quickest ever devised.

It is so well designed that one man can raise the Dump Bed to an angle of from 30 to 50 degrees in less than two minutes. Will handle with ease loads from 1 to 5 tons. This hoist is, in every respect, equal to any power hoist, but minus the expensive upkeep. Costs nothing to operate, and is foolproof.





Patents Pending

THE COLUMBIAN
Hand Hoist for Dump Bodies

is very light, compact and simple in construction. Plain lines and concealed gears give it a most pleasing appearance. It occupies but eight inches back of the driver's seat.

This Hoist can be installed on any truck in 15 minutes

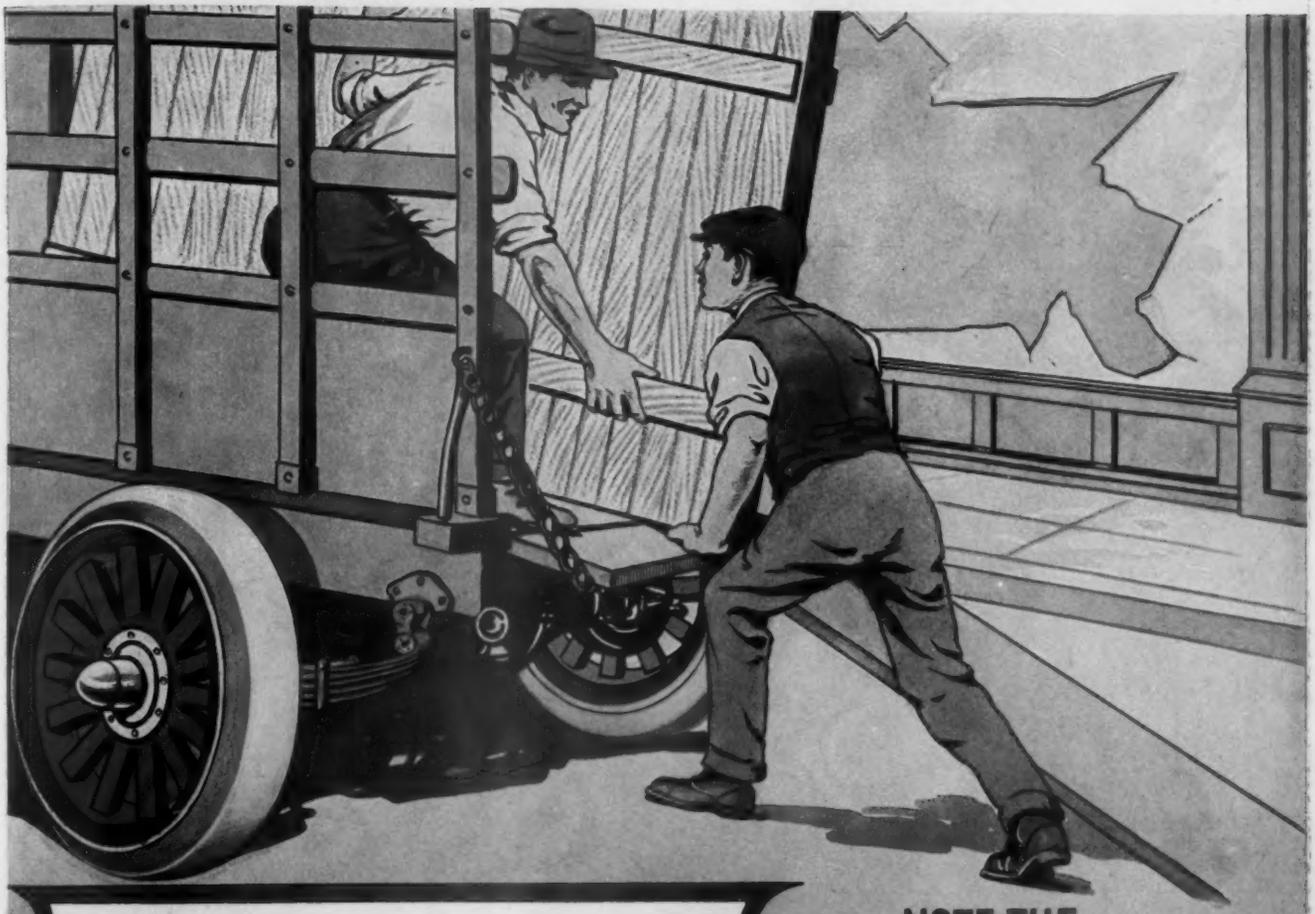
Fits any chassis, and is mounted without drilling holes into the frame.

We also build enduring dump bodies for any truck, in any style, for every purpose.

Write for illustrated folder and catalog No. 69.

1601-1621 West 12th Street

COLUMBIAN STEEL TANK CO., KANSAS CITY, MO.



NOTE THE WOOD WHEELS EVERYWHERE

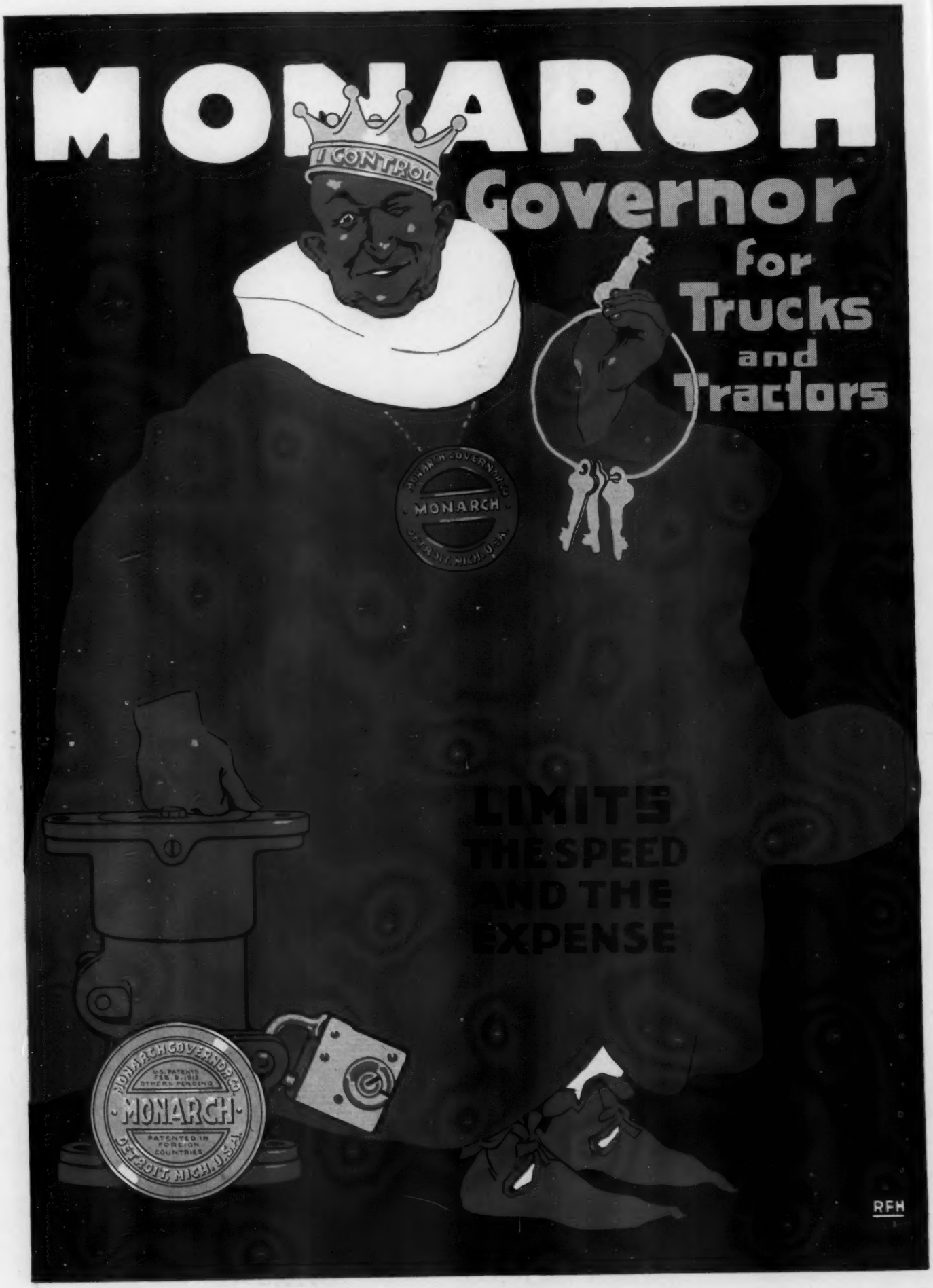
The capacity of wood wheels to absorb severe road shocks makes them indispensable to the welfare of all trucks and their contents

The universal preference for wood wheels is only added evidence that they carry any load without injury and with less wear and tear on the vehicle.

As such resilience prevents the pounding to pieces of bearings and machinery—while increasing tire mileage and engine efficiency—a truck's upkeep and depreciation are reduced to a minimum by wood wheel equipment.

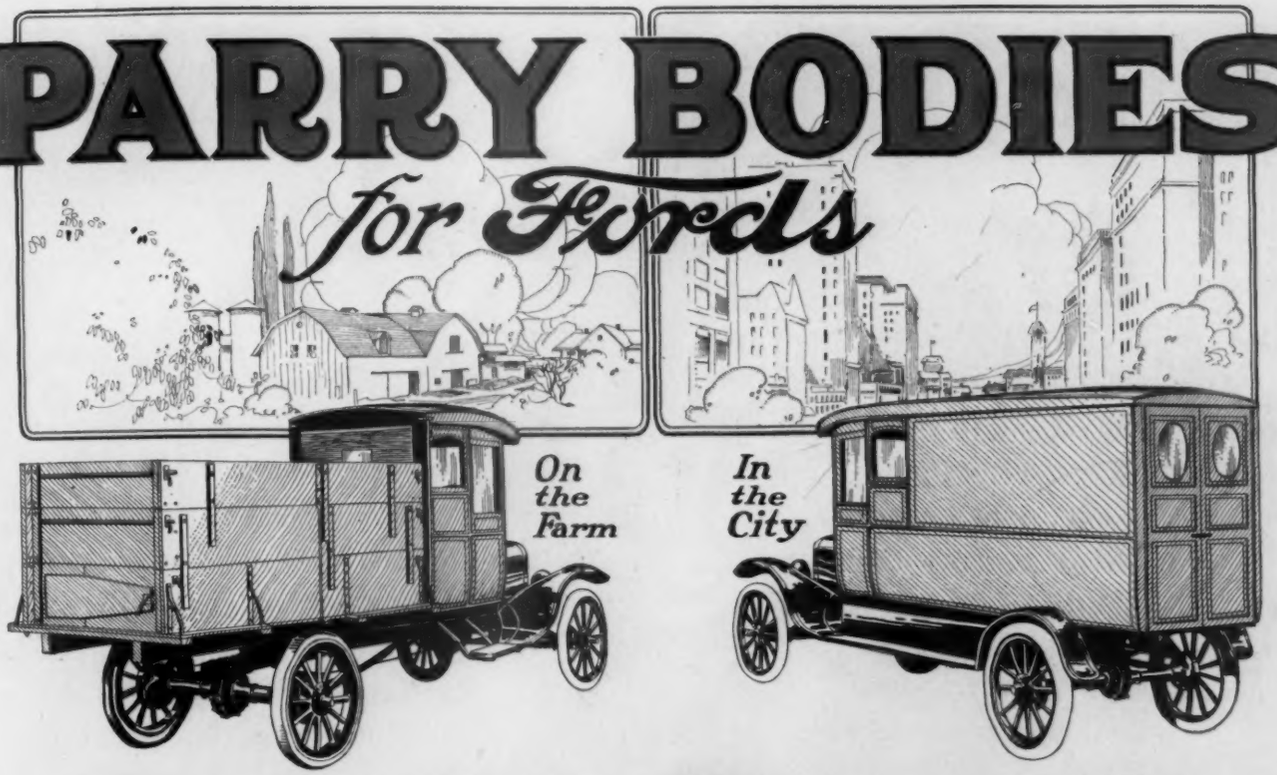
AUTOMOTIVE WOOD WHEEL MANUFACTURERS' ASSOCIATION
105 North 13th Street Philadelphia

WOOD WHEELS for MOTOR VEHICLES


MONARCH
Governor
for
Trucks
and
Tractors
I CONTROL
MONARCH GOVERNOR CO
MONARCH
DETROIT, MICH. U.S.A.
LIMITS
THE SPEED
AND THE
EXPENSE
MONARCH GOVERNOR CO
U.S. PATENTS FEB. 8, 1916 OTHERS PENDING
MONARCH
PATENTED IN FOREIGN COUNTRIES
DETROIT, MICH. U.S.A.
RFH

PARRY BODIES

for Fords



Same Day Shipments

Here are two leaders in the Parry Line that present an immediate opportunity for live dealers to make quick sales and double profits.

The illustration above, at the left, shows the new No. 630 Parry grain body—a well-built, sturdy, practical body made especially for the Ford one-ton chassis. It has almost unlimited possibilities for sales—farmers and grain dealers in large and small towns will be quick to appreciate its greater service value. And you'll be surprised that we can build such a body at such a remarkably low price.

On the right is shown No. 418 Parry enclosed body that finds high favor with merchants everywhere for year-'round delivery service. It speeds up deliveries, completely protects its contents and affords every comfort and convenience for the driver. Merchants in every line of business, wholesale and retail, are in the market right now for exactly this kind of a delivery body.

Dealers who are wide awake to the situation can cash in handsomely on these propositions. Write or wire us today for full particulars and prices.

Our facilities for manufacturing and shipping are unexcelled—we stand ready to ship your order for one or a hundred of these bodies the ***same day order is received.***

PARRY MANUFACTURING CO. · INDIANAPOLIS · U·S·A·

The Largest Commercial Body Factory in the World

No Other Non-Skid Device Offers This Feature—

a chain that can be immediately replaced

Suppose you need chain in a hurry. If your truck is Arrow Grip-Equipped, you can use ***any*** standard chain until your Arrow Grip chain is secured from your dealer.

No other anti-skid device has this feature. All have special chain and chain attachments, to be used in connection with their product that may take hours or days to replace, and that may seriously handicap your deliveries if broken, lost or worn out.

Moreover, these special chain connectors may catch in the brake drums and cause damage to the truck mechanism.

Be sure—Arrow Grip-Equip your truck.

Arrow Grip-Equipped Trucks Defy Muddy Roads

Just two parts—simple, strong and durable. Attached or detached in a jiffy, without fuss or trouble.

To Dealers: Recommend and sell Arrow Grips. Your territory may be open—get details of our 1919 dealer policy.

To Owners: Phone your dealer today for a set of Arrow Grips. Write for a copy of "The Chain of Evidence."

Arrow Grip Manufacturing Company, Inc.

Dept. F **Glens Falls, N. Y.**

Branches in Chicago, New York and Montreal

Master of Traction

ARROW GRIP

NON-SKID CHAINS FOR SOLID TIRE VEHICLES

Turn Waste into Power

A motor with poor piston rings is like a steaming teakettle—it lets power escape unused. A loss at every stroke of the piston. Hundreds of leaks a minute are wasting your customer's power.

Stop this drain—convert waste into power by installing a full set of

McQUAY-NORRIS LEAK-PROOF PISTON RINGS

Increase Power—Save Gas—Decrease Carbon

The ring with a record of eight years' successful performance. So designed that it gives uniform pressure all around the cylinder wall. Stops leakage and enables the motor to develop full power.

Explain to your customers that there is no part of their motor more vital than piston rings—they can ill afford anything but the best. Equal tension or pressure on the cylinder walls is the real foundation of piston ring performance.

This ring is a two-piece ring. The two sections equalize each other and produce uniform tension. Both sections are of the same size and strength. Each closes the expansion opening of the other.

There is a McQuay-Norris LEAK-PROOF Piston Ring to fit any truck, tractor, car, or other engine. Complete service stocks of standard sizes and over-sizes are carried by over 300 jobbers throughout the country, backed by a factory stock of 3,000 unusual sizes subject to your jobber's order. There need be no delay—these rings are ready now.

Read our free book, "To Have and to Hold Power," and you'll readily see why the distinctive design of McQuay-Norris LEAK-PROOF Piston Rings work such wonderful changes in gas engines of all kinds—trucks, tractors, automobiles, motor boats, etc. Write Dept. C.

Manufactured by

McQuay-Norris Mfg. Co., St. Louis, U.S.A.

Branch Offices:

New York Chicago Pittsburgh San Francisco Seattle
Kansas City St. Paul Atlanta Dallas

Canadian Factory: W. H. Banfield & Sons, Ltd., 372 Pape Avenue, Toronto

To Control Excess Oil

In some motors the flow of oil is so excessive that a special ring is required to control it.

McQUAY-NORRIS Superoyl RINGS

correct this condition. Used in the top groove of each piston. In the lower grooves, McQuay-Norris LEAK-PROOF Piston Rings should always be used to obtain full compression—power. Fully explained in the free book mentioned.

BRUNSWICK TRUCK TIRES

"Meriting the reputable name of Brunswick" is the judgment of truck owners and operators.

The House of Brunswick has never taken second place in any field it has entered—as knowing men concede.

Brunswick Truck Tires are built with this ideal back of them. They have met the most rigid tests because the strictest standards of workmanship and materials have been applied to their production.

Subject a Brunswick to any trial you wish. Keep a close record of the results you get. We assure you that Brunswick Truck Tires give the maximum service. We want you to prove it conclusively for yourself.

The Brunswick-Balke-Collender Co.

Branches in the principal cities of United States and Canada

General Offices: 623-633 S. Wabash Ave., Chicago

The Ideal Cushion Between Road and Load

No Extras to Buy

The Patriot is sold complete, with no "extras" to buy. Equipped with either solid or pneumatic tires. The illustration shows one of our farm bodies. We manufacture bodies for all purposes.

PATRIOT TRUCKS

Lincoln Model 1½ Tons

Washington Model 2½ Tons

Built by a $2,500,000 corporation in one of the largest factories in America devoted exclusively to the production of Motor Trucks, and supervised by automotive engineers and manufacturing executives of long and successful experience.

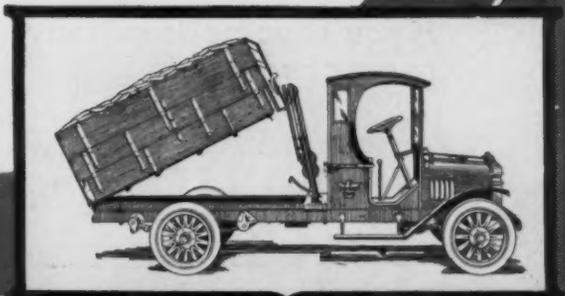
Young in years, but mature in finished product.

We are interested in making connections with Distributors and Dealers who are well regarded in their respective communities.

HEBB MOTORS COMPANY, Manufacturers

1331 P Street, Lincoln, Nebraska

Patriot Trucks are achieving a remarkable reputation in the Western States for farm hauling. The illustrations below show one of our farm bodies, equipped with the Patriot Hand Hoist.



Here is Your Copy

Send for it to-day

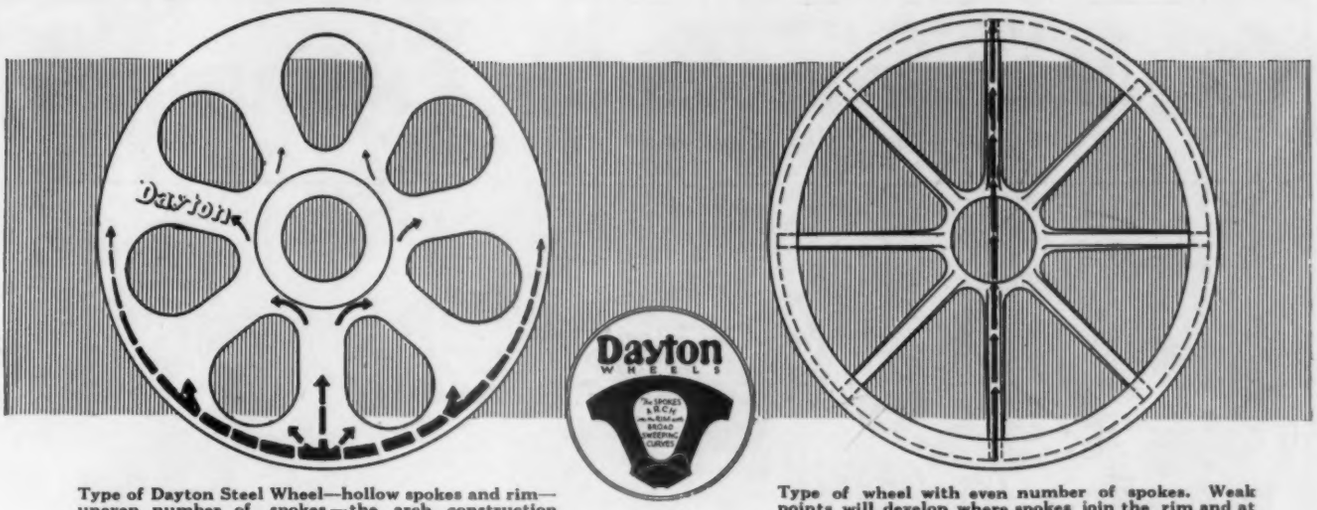
A LITTLE primer full of just the kind of information that will help the man who sells Atwater Kent Ignition.

A simple, concise booklet containing complete information written by a man who knows.

If you have not received your copy, wire today giving the name of your firm in addition to your own.

ATWATER KENT MFG. WORKS *Philadelphia*

4945 Stenton Avenue



Type of Dayton Steel Wheel—hollow spokes and rim—uneven number of spokes—the arch construction principle. The arrow shows how excessive shocks are received, dissipated and distributed throughout the entire wheel, without reaching the axle, and without fatiguing the metal.

Type of wheel with even number of spokes. Weak points will develop where spokes join the rim and at the weak, unsupported part of the rim between spokes. Arrow shows how road shocks pass directly through the hub diameter.

RESILIENCE

How it was obtained in the Dayton Steel Wheel

The Dayton Steel Wheel, with its patented construction and design, is the solution of the problem that had been confronting automotive engineers for years—providing a steel wheel with resiliency.

The uneven number of spokes prevents heavy vibrations from passing directly through the hub diameter, thus saving bearings, motor, etc., from destructive shocks.

The Dayton Steel Wheel is cast in one piece of electric furnace steel, with the same arch construction that in modern bridges gives resiliency and strength to withstand the strain of heavy traffic.

The broad, sweeping curves of the spokes equally support every part of the rim, so that extreme shocks received at any one part are dissipated and distributed throughout the entire wheel. The broad, sweeping curves also permit continuous formation of crystals, which allow uninterrupted vibration.

The hollow construction of spokes and rim further adds to its resilient qualities and provides for *dissipation* of vibration due to shocks.

The principle of the Dayton Steel Wheel is correct. In seven years' active truck work there is not a single case of where a Dayton Steel Wheel developed a crack.

They are the logical wheels for your trucks. Let us give you more reasons why you should use them.

The Dayton Steel Foundry Company, Main Office and Works, **Dayton, Ohio**

Detroit
Chicago

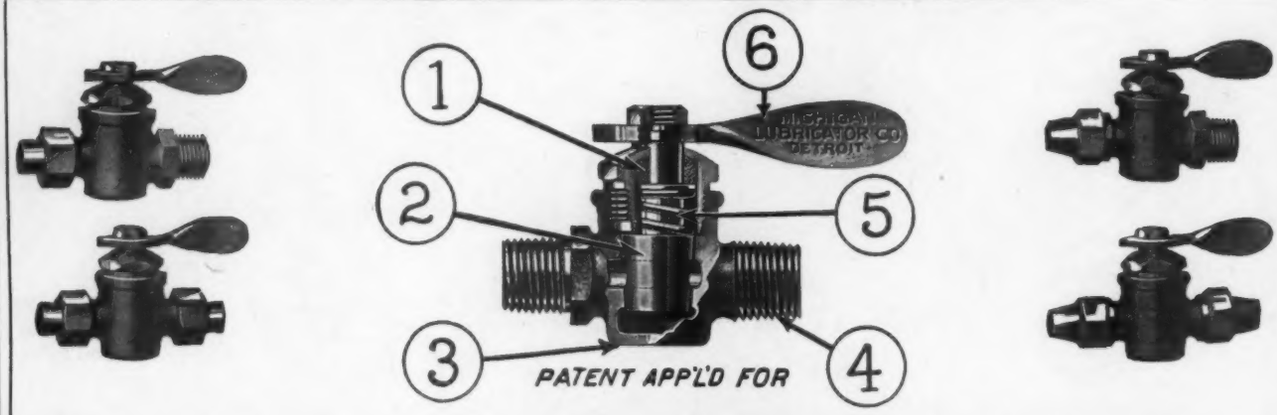
Dayton
Steel Truck Wheels

Cincinnati
New York

Patented

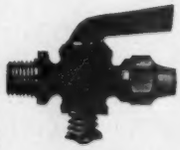
Michigan Motor Fittings

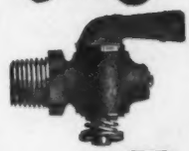
"The Guaranteed Kind"

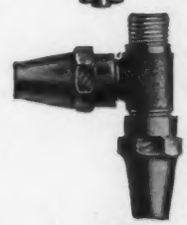


Kant-Leak Gasoline Cocks

are leak-proof





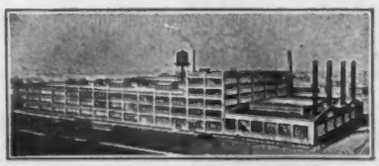


1. **The stem is packed** with an asbestos packing, which prevents any leaks at that point.
2. **The plug is ground** to a glasslike finish, which insures a perfect seat.
3. **The bottom is closed,** and so there can be no leak there.
4. **Standard connections furnished.** See our circular for various sizes and styles of connections.
5. **Stiff spring locks handle** against turning from vibration.
6. **Large, stamped brass handle** turns quite easily.

Write for Kant-Leak Circular

Michigan Lubricator Company
Detroit, Michigan

MA-44



TIMKEN-DETROIT AXLES

Good Trucks Deserve Good Roads

$60,000,000 by Pennsylvania.

$50,000,000 by Illinois.

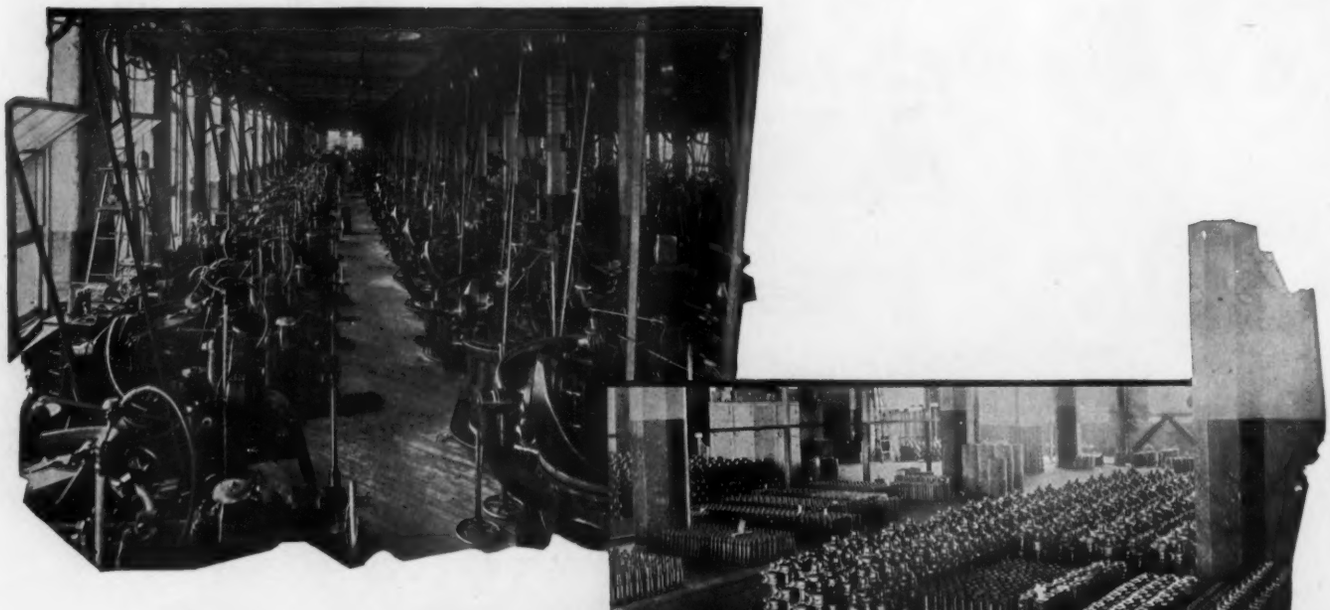
Such is the example set by these two states in their bond issues recently voted to cover the construction of state-wide highway systems.

Here is proof of widening realization that mud roads, sand pits and rutted, high-center highways have no place in today's program of motor truck transportation.

With less than ten per cent of our 2,500,000 miles of highway improved, even trucks built on foundations as well engineered and constructed as are Timken-Detroit Axles cannot show the economies of which they are capable.

THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Michigan

Oldest and largest builders of front and rear axles for both motor cars and trucks.



Deliveries on Time and in any Quantity

Whether it's a rush order for special gears needed on a set date —or gears to be delivered in even quantities on delivery dates running over a long period.

Our plant and physical equipment can absorb your gear business, and handle it with the care and attention it needs—make our deliveries on the specified date without rush, without having to speed up any *one* department beyond the working speed that means careful work.

Your gears will be delivered accurately cut from steel, every ingot of which is tested in our laboratories for agreement with the specifications ordered, and each finished gear tested and checked within the limits set as safe.

There will be no rejects. The gears delivered will be the gears ordered—and the price less than the cost to do this work in your plant.

If you are now cutting your own gears get in touch with us and let us show you how our plant can save you money.

NEW PROCESS GEAR CORPORATION
SYRACUSE NEW YORK

New Process Gears

Don't let your wheels slow up

THERE is big work to be done. New markets wait for those who can deliver the goods. Keep your factory wheels turning and your goods moving. The future belongs to those who act quickly. Pierce-Arrow trucks kept many a factory running bringing raw materials and carrying finished products to market without delays.

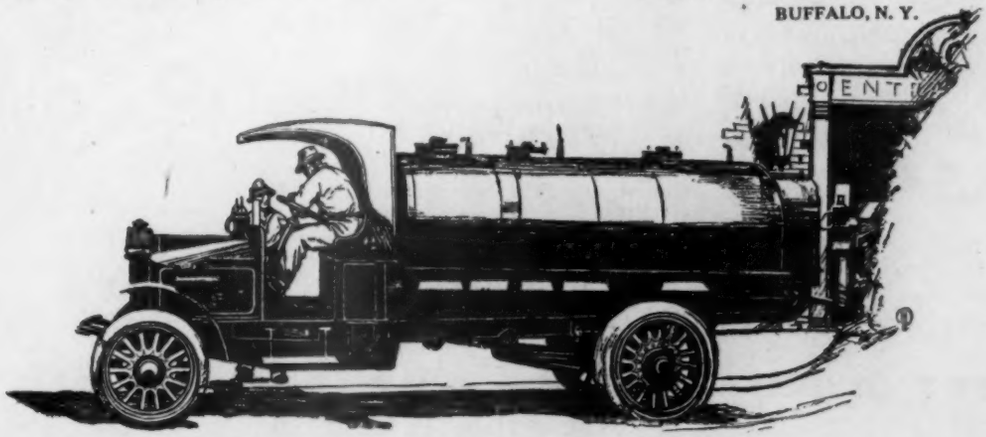
Pierce-Arrow trucks are available now to do their part. Our experience is at the disposal of those who need aid in expanding or redirecting their transportation facilities. We know what to do and how to do it cheaply and quickly.

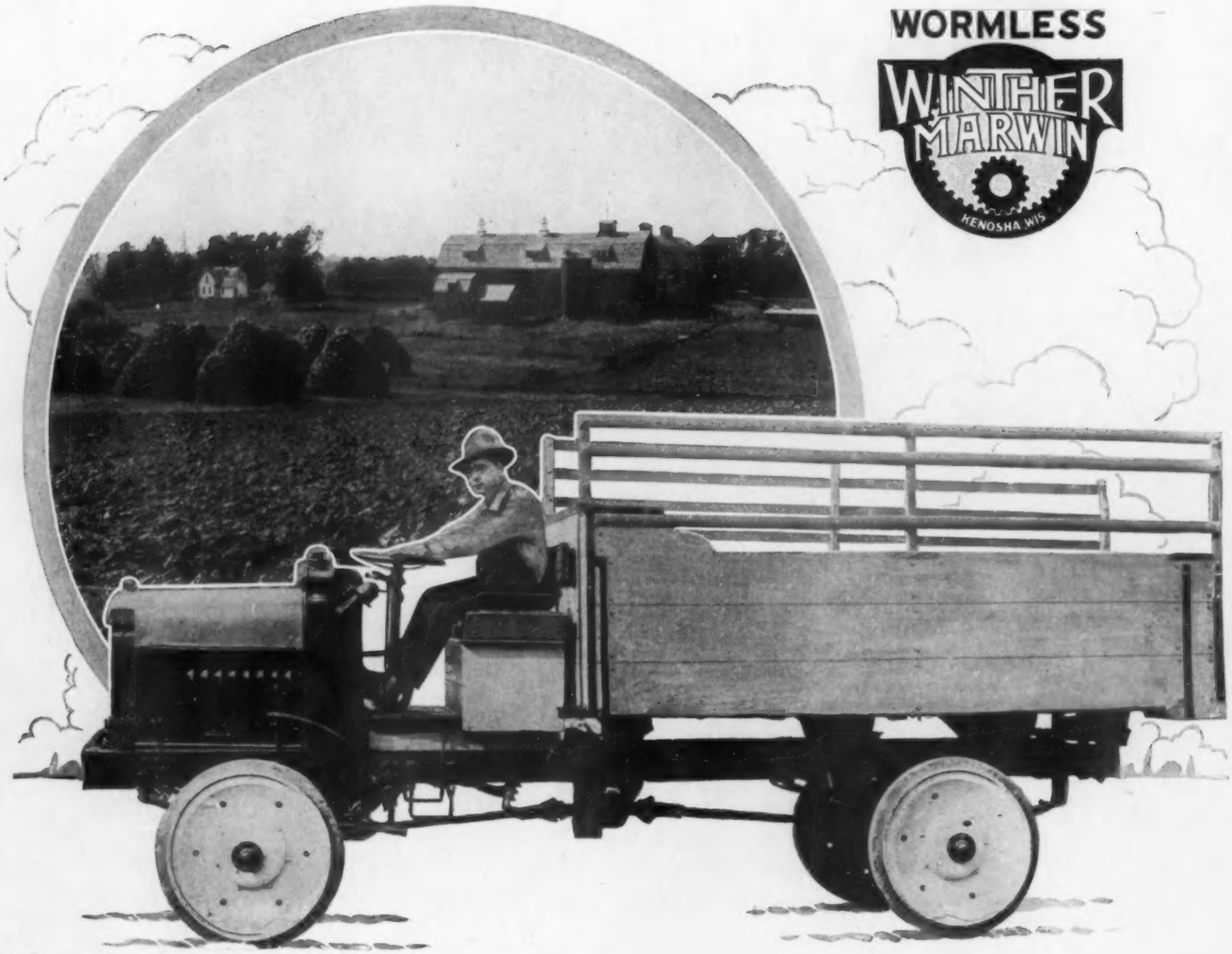
We have met successfully all conditions of service in 148 different lines of business, including yours. Ask our assistance on your problems.

PIERCE-ARROW

Delivers more work in a given time;
Loses less time on the job and off the job;
Costs less to operate and less to maintain;
Lasts longer, depreciates less and commands a higher resale price at all times.

THE PIERCE-ARROW MOTOR CAR CO.
BUFFALO, N. Y.





Get this Good Farm Business

NO adequate description of the Winther-Marwin 4-Wheel Drive **Farm Special** is possible.

This motor truck is absolutely without an equal in the record of its performance. It will go anywhere a team can take an empty wagon. It takes grades of 57 per cent. It does its work on concrete roads or the open field with seemingly equal ease.

There is no need for us to tell any motor truck dealer what this means. Built in exactly the right capacity for general farm use—1½ tons—it is, beyond question, the one motor truck on the market today which fully meets the needs of the farm.

It can be loaded in the open field. With power on all four wheels, neither road nor weather can affect its day in and day out usefulness.

The tread is standard wagon road tread. It holds the road. It has extra ample road clearance, front, center and rear, and steers as easily as a touring car.

The money-making opportunity with this truck is as great as the truck itself. We shall be pleased to give all possible information to the trade and consider applications from territory still open.

Remember, please, there is a Winther or Winther-Marwin chassis for every trucking need. 7 Winther Internal-Gear Rear-Drive Chassis—1½ to 7 tons. 7 Winther-Marwin 4-Wheel Drive Chassis—1½ to 7 tons.

Winther and Winther-Marwin prices are guaranteed against change at least until July 1st.

Winther Motor Truck Company
Department 17 **Kenosha, Wisconsin**

Economy!
There is one big reason why there are more Torbensen Rear Axles in service than any other type of truck axle—
Torbensen Drive Saves Money
It saves gas and oil because the flow of engine power is through a very efficient form of gearing, and there are no load strains on driving members.
It saves on tires through the Torbensen practice of carrying the load on a forged I-Beam, which reduces rear axle weight.
It saves on repairs. Torbensen is so simple and strong that it needs little attention. All working parts are accessible for quick adjustments and replacements.
It saves time. The Torbensen is without defect or weakness. It stays on the job and doesn't stall in mud, snow or sand, because the Torbensen Powrlok delivers power to the wheel that has traction instead of wasting power by spinning the wheel that has lost traction.
Torbensen Internal Gears have the nearest approach to perfect rolling tooth action which consumes less power in friction than sliding contact does, reducing cost of gas and oil.
Torbensen Powrlok does the work of the differential but eliminates its bad features. Powrlok drives through the wheel which has traction, preventing stalling or skidding.
THE TORBENSEN AXLE CO. CLEVELAND, OHIO
LARGEST BUILDER IN THE WORLD OF REAR AXLES FOR MOTOR TRUCKS
TORBENSEN
INTERNAL GEAR
TRUCK
DRIVE

SIGN UP WITH OPPORTUNITY

THE market for International Motor Trucks is growing fast. The sales record for 1918 far surpassed that of 1917. This year promises to swell the figures, with no end in sight. It is the motor truck dealer's inning.

A contract to handle International Motor Trucks means "cashing in" on this demand. Write us today and find out whether your territory is open, putting an application for a contract in the same letter. This saves time and adds to your chances for getting the line.

Behind this contract are the resources and prestige of a $140,000,000 organization, close co-operation and well-developed sales policies and plans that help you at every step. One of our eighty-nine service branches is within telephone call and will lend every assistance desired.

Other live dealers will read this advertisement. They know the opportunities for building a profitable and satisfactory trade in International trucks. Don't delay—it is more than an "opportunity"—it is an assured business.

Motor Truck Department

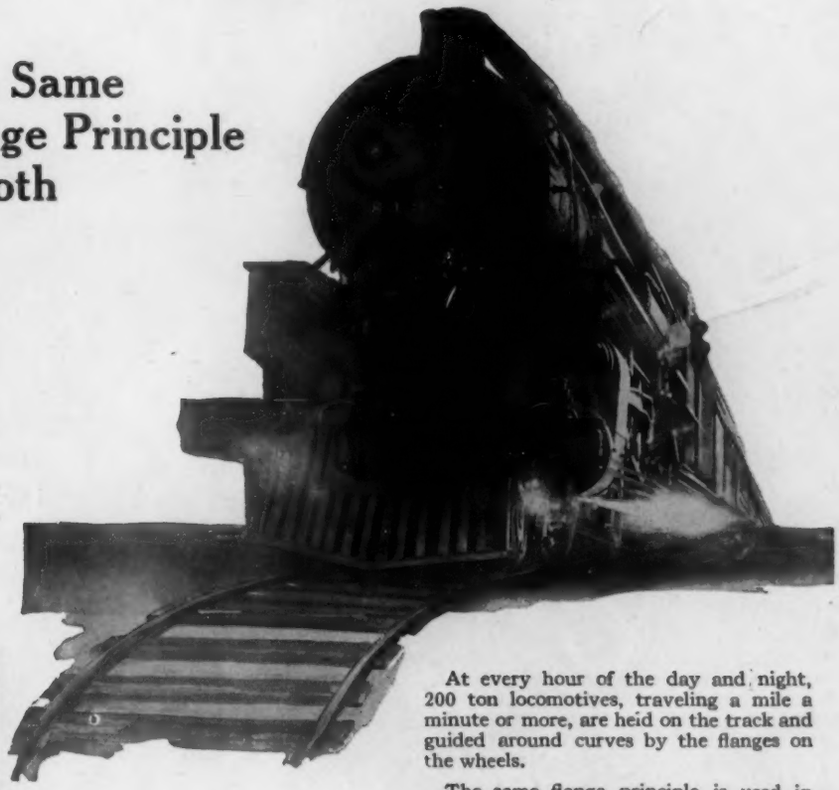
International Harvester Company of America

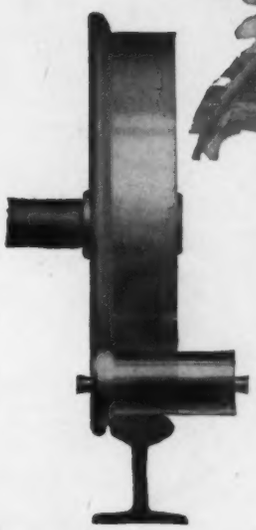
(Incorporated)

CHICAGO U S A

BOWER SAVES POWER

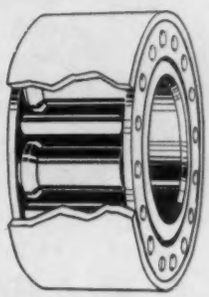
The Same Flange Principle in Both





At every hour of the day and night, 200 ton locomotives, traveling a mile a minute or more, are held on the track and guided around curves by the flanges on the wheels.

The same flange principle is used in Bower Roller Bearings to guide the rolls and resist end thrust.



BOWER

ROLLER BEARING CO.

Detroit Michigan

SRB

Makers of S R B Annular Ball Bearings, Taper Roller Bearings, Steel Balls and *Rudge-Whitworth* Wire Wheels.

How Many Balls Has a Bearing?

That all depends upon the design of the bearing.

The best engineering practice requires the maximum number.

There is a maximum number of balls in S. R. B. bearings. A reduction of load on each ball and a more even distribution of the load around the raceways is thereby accomplished and—

The breakage of balls that grinds raceways to ruin is eliminated.

STANDARD ROLLER BEARING CO.
PHILADELPHIA, U. S. A.

SALES OFFICES:

Detroit,	936 Woodward Ave.
Chicago,	2206 S. Michigan Ave.
Indianapolis,	646 N. Meridian St.
New York,	1737 Broadway
Boston,	84 Brookline Ave.
Cleveland,	2062 Euclid Ave.
San Francisco,	41 Spear St.
St. Louis,	3126 Locust St.

WHAT MAKES *VALUE* *in* A MOTOR TRUCK

A TRUCK yields so much performance for so much money—price plus operating cost. What it can do, how long it can do it, how dependably, at what cost, *alone* determine its value, into which enter five factors to be carefully considered by every purchaser. These are:

Record and Performance

WHAT a truck can do is measured by what it has done, in work accomplished and length of service. Where comparative cost records are properly kept, single unit White installations grow into fleets. In mixed fleets, White equipment is uniformly selected for the hardest task.

The Maker

EVERY truck needs a sponsor a maker whose name is a guarantee of honest, efficient manufacture, whose policies and resources assure that he will be here to stand back of his product *permanently* The importance of this is apparent when you consider how few makers survive in any line of manufacture.

The White Company is financially sound It has been building highest quality motor vehicles for eighteen years, and holds a manufacturing position second to none.

The Factory

THE White factory is one of the largest in the industry and is so modernly equipped that a very large volume of output is obtained per unit of labor Thus the purchaser receives value fully commensurate with his investment.

Truck Experience

THE White Company sells not merely trucks. It sells efficient transportation. It *knows how* to install the kind and size of equipment for a given task, can adjust the truck installation to keep step with the business. It has knowledge gained by years of experience with many thousands of trucks in all lines of trade—*an asset of the greatest importance to the purchaser*

Service Facilities

TO get maximum earnings out of a truck, it must be *kept going*, and this can be assured only by resourceful and convenient service to the owner

The White Company has covered the country with facilities for quick and complete service—plants, spare parts and field organization It required years to build up. No new manufacturer can do this; no small manufacturer can afford it.

The purchaser of White Trucks secures motor transportation at the lowest cost, expertly installed and permanently protected

THE WHITE COMPANY,

CLEVELAND

Wanted—
Truck Parts and Accessories

The undersigned company is the purchasing representative of the

Fabrica Cubana de Automoviles y Camiones

(Cuban Automobile and Truck Works)

This company, capitalized at $1,500,000 (of which over 75% has been paid in or subscribed for by prominent business men and a banking institution), is about to engage in the manufacture of a line of motor trucks of ¾, 1, 2, 3 and 5 ton capacities.

As its American representative, we are desirous of hearing from makers of truck parts and accessories as to the quality and features of their products, ability to make quantity deliveries and prices. As quantity production is early contemplated, we desire this information at once.

Experts Wanted

The producing company has a good opening for one or more experts in connection with the production of these trucks. A good proposition will be made to right men. State qualifications and experience.

Address all communications to

Quaker City Supply Company, Inc.

Attention Mr. J. J. Polanco

126-128 South Front Street **Philadelphia, Pa.**

BETHLEHEM
Internal Gear Drive
MOTOR TRUCKS
Dependable Delivery

BETHLEHEM MOTORS CORP'N. ALLENTOWN, PA.

Bethlehem Possibilities
Are Your Possibilities

What proportion of the big Bethlehem output is your territory going to consume?

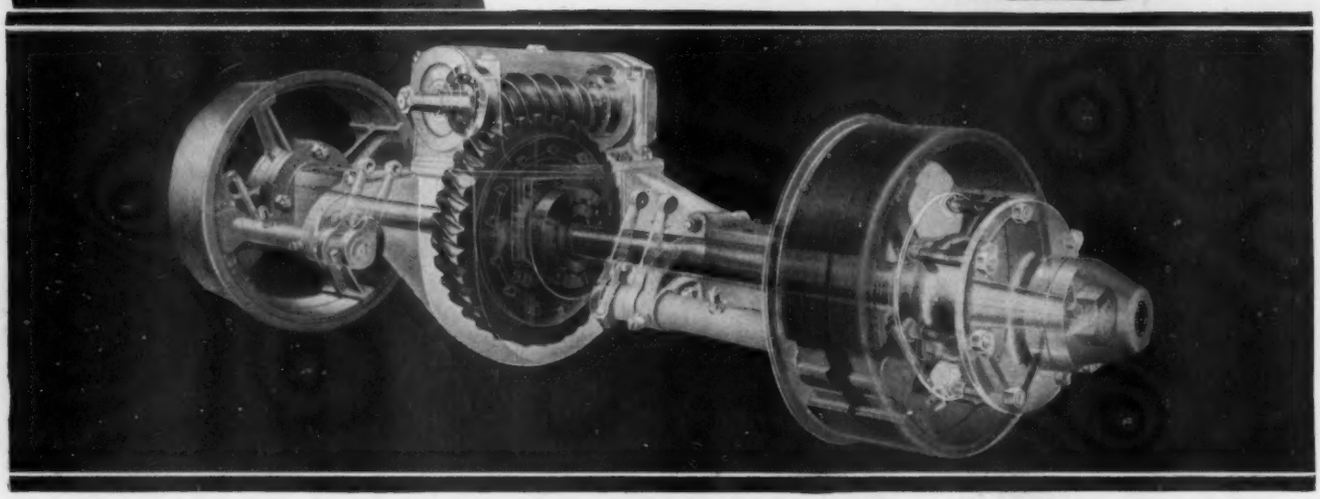
Some truck dealer big enough to visualize Bethlehem possibilities is going to dominate the truck field in your community. Bethlehem possibilities are your possibilities. Capitalize them. Write us about the Bethlehem plan.

1½ Ton Chassis	2½ Ton Chassis	3½ Ton Chassis
$1965	$2365	$3465

F. O. B. ALLENTOWN, PA.

SHELDON

WORM DRIVE AXLES



Keeping the Worm Silent, Smooth—and *Durable*

One of the features characterizing the Sheldon policy of ***quality above cost*** is the use of high grade ball bearings on the worm gear mounting.

To employ any other kind would be to ignore the judgment of matured engineering experience.

Look at the smallest detail in Sheldon construction—see how perfectly it fits into the finished scheme—and you find one of the reasons for the marked supremacy of Sheldon Worm Drive Axles in performance, in endurance and in economy of maintenance.

SHELDON AXLE & SPRING CO., *Makers of axles and springs for heavy duty service for more than 50 years* Wilkes-Barre, Pa.

What Does the CLYDESDALE Controller Do?

WE offer a First Prize of $100, a Second Prize of $50, a Third Prize of $25 and Five Honor Prizes of $5 each, for the best answers to this question.

In case of a tie between two or more contestants, the full amount of the prize will be awarded to each.

THIS contest is open to anyone who owns or operates a Clydesdale Truck. What we want is practical testimony from practical men. Literary ability cuts no figure one way or the other.

Write a sentence or a short description telling what you have found that the Clydesdale Controller accomplishes in the operation of the Clydesdale Truck—what it does for the driver or what it does for the owner. Use ten words or a hundred as you please.

We want to use the material you send us in getting to the truck-buying public the real importance of this device. Users of the Clydesdale Truck say that we don't do our Controller justice in our advertising, so we ask them to help us.

BOARD OF JUDGES:

A. C. BURCH
Vice-President
The Clyde Cars Company

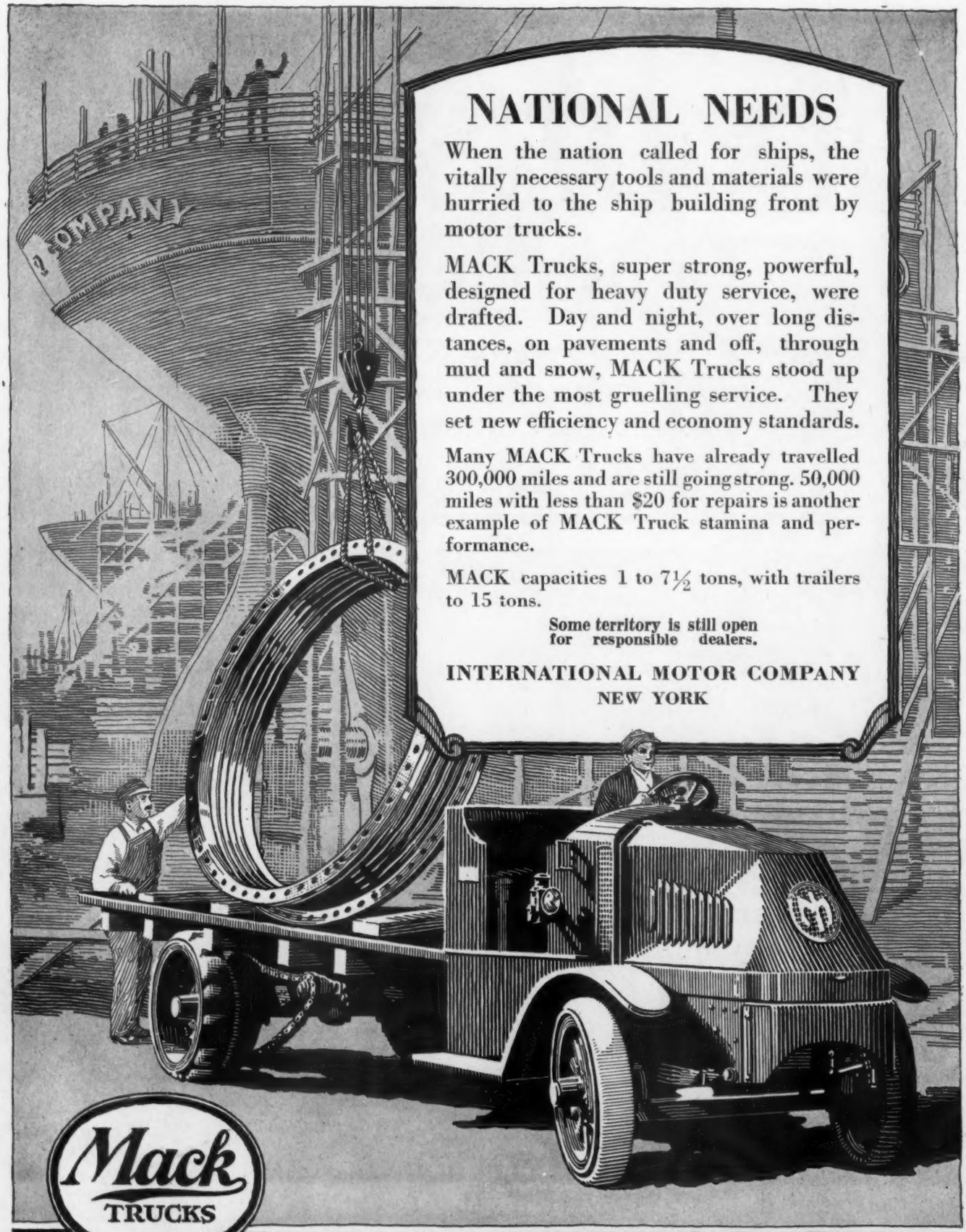
WALLACE B. BLOOD
Member S. A. E.
The Green, Fulton, Cunningham Co.

DARWIN S. HATCH
Editor
Motor Age

Contest Closes April 1st, 1919 *Address all Entries to Contest Department*

CLYDESDALE MOTOR TRUCKS, CLYDE, OHIO

(1C)



NATIONAL NEEDS

When the nation called for ships, the vitally necessary tools and materials were hurried to the ship building front by motor trucks.

MACK Trucks, super strong, powerful, designed for heavy duty service, were drafted. Day and night, over long distances, on pavements and off, through mud and snow, MACK Trucks stood up under the most gruelling service. They set new efficiency and economy standards.

Many MACK Trucks have already travelled 300,000 miles and are still going strong. 50,000 miles with less than $20 for repairs is another example of MACK Truck stamina and performance.

MACK capacities 1 to 7½ tons, with trailers to 15 tons.

Some territory is still open for responsible dealers.

INTERNATIONAL MOTOR COMPANY
NEW YORK

Mack TRUCKS

"PERFORMANCE COUNTS"

COVERT TRANSMISSIONS

East or West it's COVERT

You will find Covert equipped motor trucks hauling giant loads over the trails of the far west—

You will see hundreds of trucks with Covert Transmissions on crowded Canal Street, Chicago, West Street, New York City.

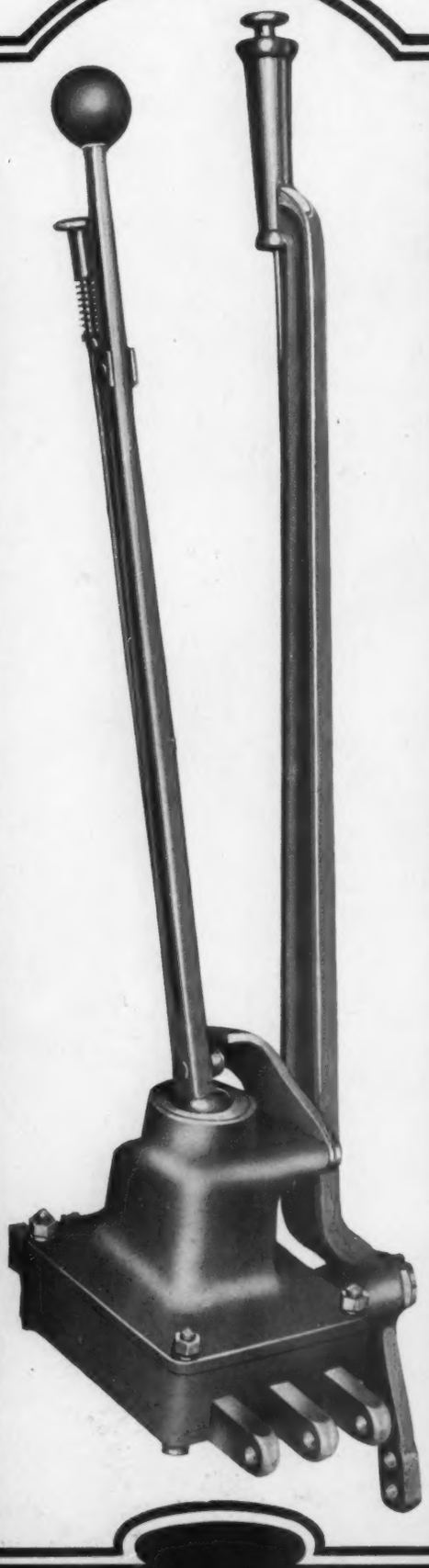
Whether it is in delivering a steady flow of power to the rear axle in hauling great loads over virgin roads in the West, or where the crowded traffic conditions of the East demand easy and perfect transmission control, you will find Covert Transmissions.

Covert Gear Company, Inc.

Sales Engineering and Service
967 Woodward Avenue
Detroit, Mich.

Factories:
Lockport, N.Y.
Detroit, Mich.

Export Department, American Motors, Inc.,
100 Broad St., New York City



FULLER
CONTROL SETS

These control sets are essential complements to Fuller clutches and transmissions. We are specialists on these three important parts. Our output is, therefore, impressive in quantity and character. The name "Fuller" in truck specifications is a full guarantee of the high efficiency and durability of the parts so named. Recently enlarged facilities were made necessary to keep pace with growing orders. May we serve you? Quality, prices and deliveries will appeal to your good business judgment.

FULLER & SONS MFG. CO.

Kalamazoo, Mich. - Detroit Office, Kresge Bldg.

Phone - No 684. Phone - Cadillac 2617.

GMC First to Reduce Prices

The first truck maker to announce a reduction of prices was the General Motors Truck Company.

In returning to a pre-war basis, the only change made was a change in price.

Factory equipment remains as it was when the war ceased, and quantity production continues—with the same high-grade material, the same careful inspection, and with the benefit of every economizing facility acquired during government production.

That the government selected GMC trucks as we built them, and made them a Government Standard, is a distinct compliment to GMC design and quality.

Trucks that will stand the hard usage of war work and fail only when destroyed by enemy shells can and do render satisfactory service to American business men.

Our customers include many of the largest and best-known business concerns in the world. Let the GMC dealer show you why it is economy to use GMC trucks, or write direct to truck headquarters for information.

GENERAL MOTORS TRUCK COMPANY
Pontiac, Michigan

GMC TRUCKS

448

Goods that look well are half sold, as the old saying goes; but the Maxwell was never built on that principle. 300,000 now in use have laid the dust for all time on the subject of its road ability. And now to finish, to add the touch of charm, the new Maxwell comes forth dressed in new garments. Which will not make it run any better, but which will make it even easier than before to sell.

Maxwell

A Complete Line

To be able to supply our customers with a complete line of engines, adaptable to a similarly complete line of trucks or tractors has been from the start the aim of this corporation.

That ambition is now attained.

Hinkley Models HA and HAA are now in process of production and will be ready for delivery within 30 days.

HINKLEY
HEAVY DUTY AUTOMOTIVE
ENGINES

These new Hinkley models differ only in size. In workmanship, materials and principles of design they are identical.

Both bear plainly a close relationship to the stalwart U. S. Military Class B Engine which has been to date our sole product.

Their sturdy proportions, large bearing surfaces, unusual cooling facilities and generally advanced design are characteristic of their breed.

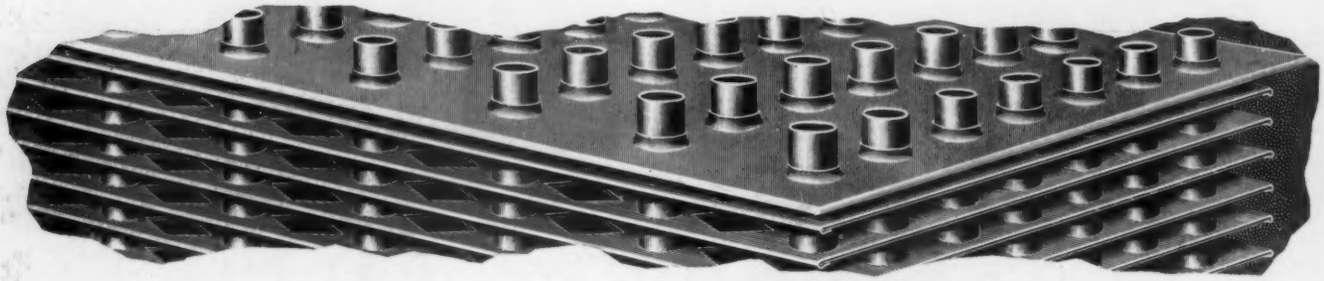
Model HAA has a bore of 3¾ inches by 5¼ inches stroke and is adaptable to trucks of 1 and 1½ tons, or to 2-plow tractors. With 4-inch bore this Engine easily handles a truck of 2 or 2½ tons, or a tractor pulling three plows.

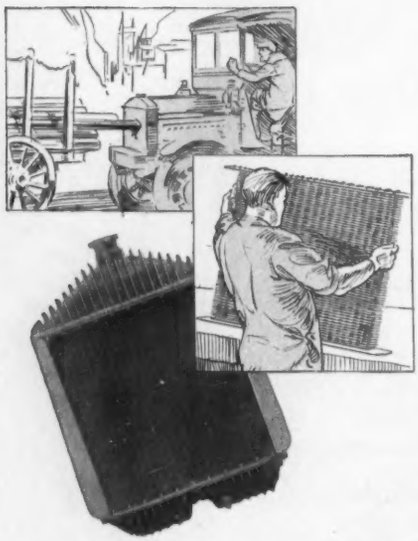
Model HA has a bore of 4½ and a stroke of 5½ inches. It bridges the gap between Model HAA and our Military Class B Engine, the two thus covering the field of trucks from 3 to 6 tons, and of tractors from four plows upward.

Because of the wide range of inquiry regarding these Engines, we have prepared duplicate drawings of each, with mounting dimensions.

It will be a pleasure to us to submit these drawings to manufacturers of trucks or tractors who may be considering us as a source of engine supply.

HINKLEY MOTORS CORPORATION
930-34 West Fort Street **Detroit, Michigan**
Export Department, American Motors, Inc., 100 Broad Street, New York





To vitally damage a radiator core of the continuous fin tubular type a blow must actually penetrate it or break the shell. Repairs, however, are easily and quickly made

Main Plant and General Offices

The continuous fin tubular type radiator is built up of two primary parts — vertical water tubes and horizontal cooling fins

A network of braces comprises the skeleton of both the modern skyscraper and the continuous fin tubular type of radiator core.

There can be no perceptible vibration in this type of construction. Rigidity is built into it—resistance to blows and shocks.

In addition to the function of bracing, each unit performs in another capacity; the vertical tubes carry the water, the horizontal fins dissipate the heat. Each fin constitutes a separate radiator in itself. Its front edge is reinforced with a steel wire and the stress of a blow is therefore distributed over the entire core, and not concentrated at the point of contact.

Air is permitted to rush through this type of core practically unimpeded. By the rapid changing of air, maximum cooling is accomplished. This construction brings the heated fin surfaces into contact with the greatest volume of cool air. Every ounce of metal carries its full share of the heat.

The problem is not to heat a given volume of air, but rather to cool a given amount of water with the whole atmosphere to use freely as a cooling agent.

The easy repairing feature of this type of core adds another desirable feature.

Manufacturing all types of radiators since the beginning of the motor car industry, has given this company a wealth of specialized knowledge on the subject of cooling systems for gas engines. Our recommendation of the continuous fin tubular type of radiator is therefore obviously for the insurance of greater efficiency, satisfaction and dependability.

McCord Manufacturing Co., Inc.
Detroit **Michigan**

McCORD
RADIATORS

KISSEL TRUCKS
Uninterrupted Transportation

EVERY month, week, day—in every season—is the Kissel Truck performance range. An incomparable chassis of proven strength, durability and capacity—the Kissel-built power plant for motor truck purposes only—the ALL-YEAR Cab for driver's protection in cold and stormy weather—these are transportation insurance 365 days throughout the year.

Kissel Trucks maintain schedules because they are built to overcome obstacles unsurmountable with trucks of less development. Eleven years of motor truck designing and construction experience have developed Kissel Trucks to this highest point of transportation efficiency.

There is a Kissel Truck built for every line of business. The nearest Kissel Dealer has specifications, details, price and delivery data. See him.

KISSEL MOTOR CAR CO., Hartford, Wisconsin, U. S. A.

Construction adds to the wealth of the country; build now. U. S. Dept. of Labor, W. B. Wilson, Secretary.

CREW LEVICK
MEANS
QUALITY

THINK OF 1920, TOO!

The difference between a Quality Oil and others may not show today or next week. It's in prevention of wear and tear, longer life to the working parts, that you'll find the reason for selecting

CREW LEVICK

Perfection
Motor Oil

Derived from paraffin-base crude, taken from our own Pennsylvania wells, this crude is recognized as the best base for lubricants.

They are refined in our own refineries by methods perfected during almost sixty years of experience, and under the constant supervision of expert chemists and engineers.

Thus, controlling our product from start to finish, we are able to maintain and guarantee the uniformity of its high quality.

Crew Levick Petroleum Products are sold in gallon and five-gallon cans, half-barrels and barrels. Correspondence invited.

CREW LEVICK COMPANY

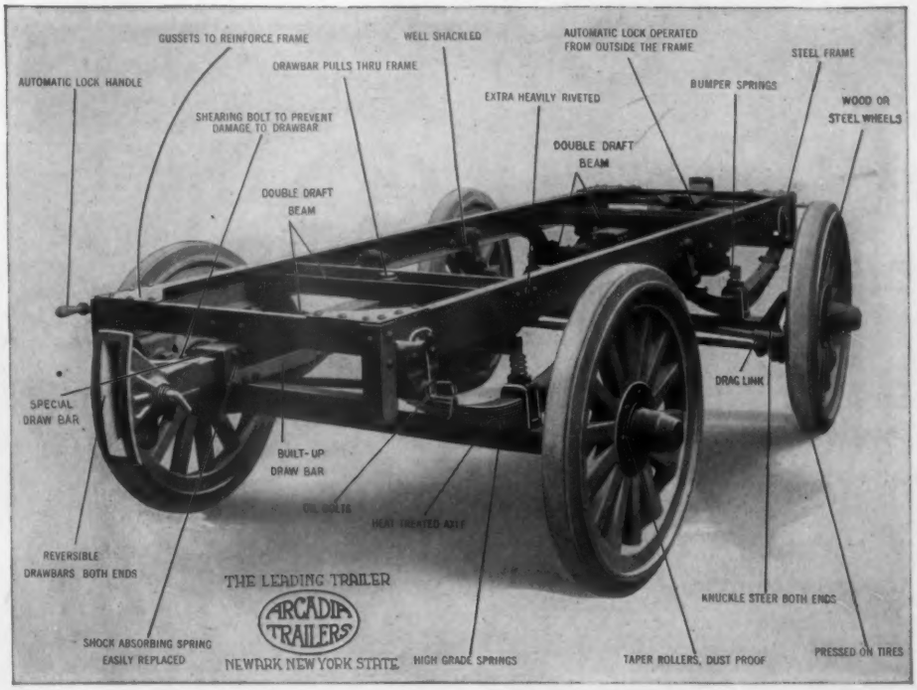
127 North Broad Street, Philadelphia

(Subsidiary Cities Service Co.)

Branches and Agencies in Principal Cities of the World

Are You Ready for Trailer Business?

Add Trailer Profits to Your Profits: Distribute Arcadia Trailers



ARCADIA—THE LEADING TRAILER

When a Better Trailer is Built, It Will be an Arcadia

TAKE NOTE OF OUR SPECIFICATIONS

The cut above tells the story. Don't just look at it—study it. Arcadia Design is a perfected one—a development resulting from experience. The Trailers are reversible; the steering is right, developed from our own design; they will not "sway"; they follow the truck; may be backed to an exact point. Built with or without brakes. Drawbar lock is automatic. All parts are simplified. There is no mystery about Arcadia Trailers.

An Arcadia Trailer behind the truck will double the load and divide the cost. In addition, it will relieve the truck of overloads and consequent injury.

Built in 1, 2, 3½ and 5 Ton, Four-Wheel Models; heavy Semi-Trailers when needed. Also a special Trailer for farm use.

"Opportunity knocks but once." It is knocking NOW. An Arcadia Trailer Agency established NOW will prove a valuable asset forever. "No business man will hesitate to invest money in a legitimate money-making, money-saving business proposition." He will buy Trailers.

Dealers are backed by a progressive organization operating a factory of 75,000 feet floor space and acres of land to build on. Co-operation is the spirit. If you are awake to the situation you will be first in your field—not last.

We are closing territory every week, but have excellent sections still open. Any day may locate someone in your dooryard. Get in touch first—before the other fellow—not after.

WRITE TODAY, stating what territory you will cover

ARCADIA TRAILER CORPORATION **Newark, New York State**

ARCADIA TRAILERS

AUTOMOTIVE PRODUCTS CORPORATION
Sole Foreign Sales Representatives
Woolworth Building, New York City

CHAS. C GATES, E.M

How Do You Pick a Fan-Belt?

Here's a Remarkable Test

TESTED against seven other well-known makes of fan belts and proved to outwear them all. That's the kind of record you want back of the fan belt you buy—or sell.

The test was made independently by one of the largest motor manufacturers in America.

All the other belts went to pieces after from 72 to 100 hours' dynamometer test; but after 214 hours—more than twice as long—this belt was pronounced by the testing engineer to be practically as good as new.

Such a test as this proves beyond question that the Vulco process makes better fan belts. It shows you what's back of our positive guarantee that a Gates Vulco-Cord Belt will outwear all other belts, whether of leather, webbing or fabric.

Trucks are severe on fan belts: there's more heat, more grease, and it's most important that the fan should operate at full efficiency.

A broken fan belt, or one that slips, means valuable time lost—time that represents dollars and cents to the owner.

No truck manufacturer or dealer can afford to send out a truck fitted with anything less than the best fan belt he can procure.

It is with the confidence born of *many* tests—the most severe that could be devised—that we invite you to test Gates Vulco-Cord Fan Belts for yourself—under your own supervision—and against any other belt on the market.

More than 4,000,000 have already been sold this year.

GATES
Rubber Company

DENVER

"World's largest makers of Fan Belts"

Today is the Time to Get Into the Trailer Business

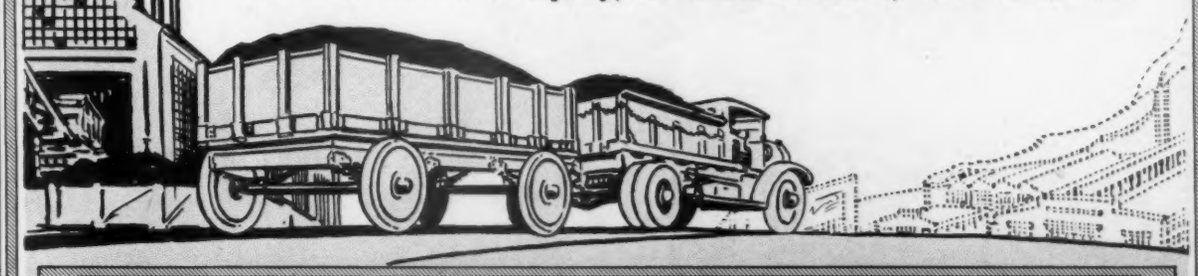
For years to come the Trailer will be the big money-maker in the Automobile and Motor Truck Industry.

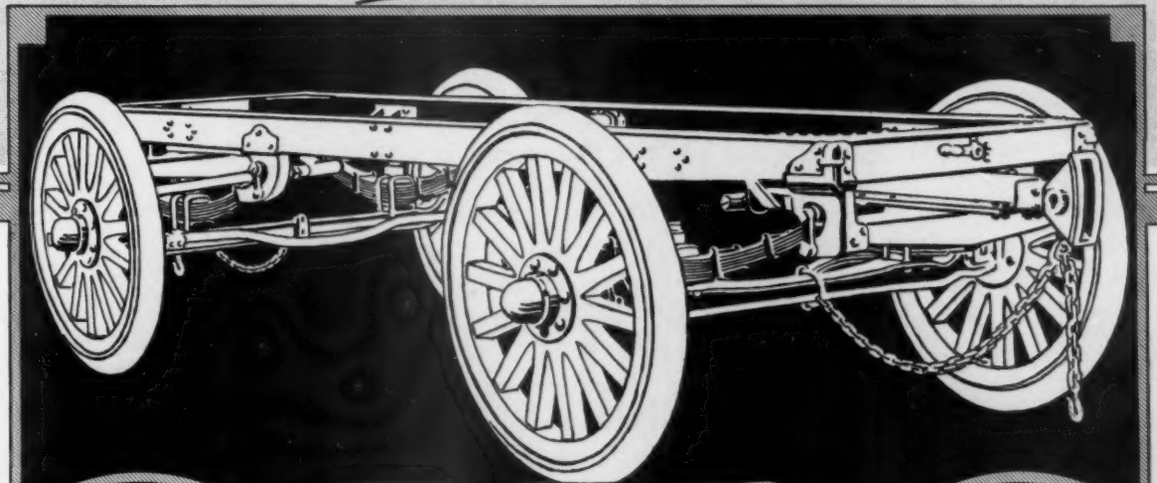
Right today thousands of motor truck owners are convinced that trailer haulage is the solution of their motor transportation problems. Orders are ready and waiting for every dealer who handles the right line of trailers and puts the right sales effort back of it.

Ohio Trailers are backed by years of actual motor trailer building experience. They have been proved in commercial, industrial and military service. They are built and guaranteed by the largest concern in the country building trailers exclusively.

Our capacity has been released by the Government. We are ready for connection with the best dealers in every section of the country. Territory is fast being assigned. If you are in position to take advantage of an unusual degree of co-operation in handling trailer business, write or wire us for full information on the Ohio Trailer Franchise.

The Ohio Trailer Company, 14 Oakview Road, Cleveland, Ohio





OHIO TRAILERS

A Certain Indication of a Quality Standard

When a motor vehicle manufacturer uses a Detlaff Clutch, you can be certain that his product is based on **quality,** not **price.**

For Detlaff Clutches necessarily cost more—in design, material and workmanship they meet the highest standard. We cannot hope to supply the maker who is a "price buyer." But our clutches appeal instantly to the builder who seeks the best in every part.

You cannot go wrong in choosing a car or truck that has the "Velvet Clutch with the Bulldog Grip."

Detlaff Clutches are made in sizes suitable for all classes of vehicles, from the medium size car or light truck to the giant 5 ton truck

A. J. DETLAFF COMPANY

Makers of Clutches and Controls Exclusively

124 Lafayette Ave., East **Detroit**

Somehow or other you *know* Garford stands for quality, stability and value.

"Users Know"

The Garford Motor Truck Company, Lima, Ohio
Motor Trucks of all Capacities
Distributors and Service Stations in all principal cities

A 1½ Ton Truck Worthy of the Name It Bears

The 1½ ton Gramm-Bernstein is built as you would expect B. A. Gramm to build it.

The name alone, supplemented by a price so moderate, was enough to attract instant attention among thoughtful truck buyers.

Business men know what that name has stood for during the past 18 years. But even had the name of this 1½ ton truck been strange—its outstanding superiorities would have been recognized at once.

Strong Evidence of Unusual Value

That's what they are—strong, outstanding, positive evidences of value which stamp it instantly as an unusual 1½ ton vehicle.

As an illustration, take the one important item of springs.

These Gramm-Bernstein springs are longer than you would expect to find in a truck this size. They have more leaves. And, in addition, they are made of Vanadium alloy steel.

Less costly springs might do as well. But B. A. Gramm will not endanger the remarkably fine, clean reputation his trucks have been 18 years building.

Rear Axle Fit for a 2 Ton Truck

The same thing applies to the rear axle—the load carrier. It would stand up under a 2 ton truck. Its bearing sizes are from one to two sizes larger than those specified for many other axles of the same stated capacity.

But Mr. Gramm puts this axle into a vehicle he rates at 1½ tons. He goes to such lengths to insure his buyers a long-lived, thoroughly reliable truck.

That has been his practice throughout. Some engineers doubtless would consider his transmission gears entirely adequate for a 2½ ton truck. Mr. Gramm knows they are exactly right for a 1½ ton truck.

Both Brake Sets Work on Rear Wheels

Mr. Gramm has found that a brake working on the propeller shaft imposes excessive wear on the rear bearing of the transmission.

So he takes the better—likewise costlier—method of operating both sets of brakes on the rear wheels.

The propeller shaft is two-piece, with three universal joints instead of two. This does away with the "whip" of the ordinary one-piece shaft.

Misalignment and undue strain of the frame are prevented by the extra size of this member. It has six sturdy cross members—which are gusseted for greater strength—and rear corner braces, in addition to the usual corner gussets.

You see now why we call this 1½ ton truck an unusual value, deserving of far more than ordinary consideration.

It is unusual in the character of its units. It is even more unusual in the practical experience and engineering skill which are evident in its design and construction.

It Will Uphold a Good Truck Name

It is the first 1½ ton quick-delivery truck we know of which combines, *at an attractive price*, all these elements—which are necessary for successful truck operation.

It is worthy, in every way, to take its place alongside Gramm-Bernstein trucks of greater capacity.

The Gramm-Bernstein line is complete, including all required capacities from 1½ ton to 5 ton—all chainless drive.

We ask truck buyers and business men to look into this line, and to examine carefully the Gramm-Bernstein records for economical operation and remarkably long life.

$1895

F.O.B. Lima, Ohio

1½ Ton Chassis With Driver's Seat

$1975 1½ Ton Chassis with all-weather cab, doors, curtains and windshield.

$2110 1½ Ton Truck, complete as illustrated, with flareboard express body, which is convertible into a slatted express body and a covered, slatted express body.

THE GRAMM-BERNSTEIN MOTOR TRUCK COMPANY

GRAMM BERNSTEIN

MANUFACTURERS OF HIGH GRADE CHAINLESS MOTOR TRUCKS - 1½ - 2 - 2½ - 3½ - 5 TONS

Lima, Ohio U. S. A.

Builders of the first standardized Liberty U.S.A. Truck

S. A. F. E.
UNIVERSAL JOINT

Manufactured By

MECHANICS MACHINE CO.

of ROCKFORD, ILLINOIS

That **S. A. F. E. Universal Joints** have been selected as standard equipment by thirty of the largest and most successful United States Manufacturers of Motor Vehicles is an endorsement, by use, second to no other Universal Joint now made. **S. A. F. E.** Joints are designed and produced for all types of cars, trucks and tractors.

Send all inquiries to
C. A. S. ENGINEERING CO.
Exclusive Representative
790 Woodward Ave., Detroit, Mich.

STRAIN-PROTECTED
STEERING GEARS

Manufactured By

C. A. S. PRODUCTS CO.

of COLUMBUS, OHIO

C. A. S. Strain-Protected Steering Gears are made for Trucks, Tractors and Passenger Cars. They are all worm and gear type, with controls mounted either above or under steering wheel. Parts subject to excessive strain are made of Special Alloy Steel, perfectly heat treated. Adjustments are provided to take up wear in all directions. All bearings are bronze bushed.

Send all inquiries to
C. A. S. ENGINEERING CO.
Exclusive Representative
790 Woodward Ave., Detroit, Mich.

HEART-SHAPED CORE
C. A. S. RADIATORS

Manufactured By

C. A. S. RADIATOR CO.

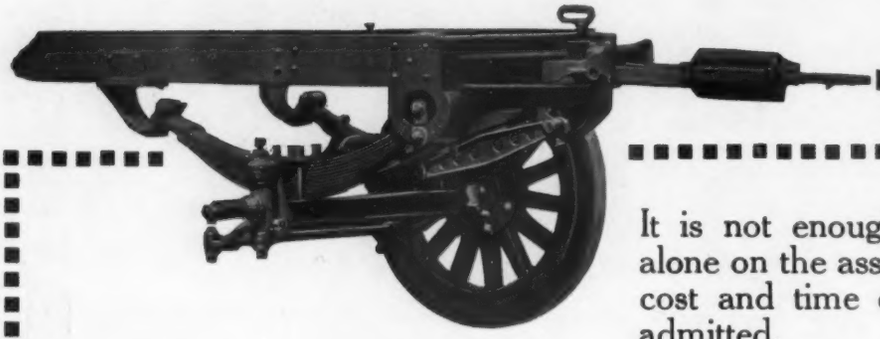
of JACKSON, MICH.

We guarantee that inch for inch the **C. A. S. Radiator** is the most efficient Radiator manufactured, either in the United States or Europe, and its heart-shaped core makes it exceptionally strong, yet light in weight. It is vibration-proof, with extra large air cooling and water spaces. It can be repaired quickly, efficiently and economically, and may be thawed, even if frozen solid, without causing leaks or injury to the core.

Send all inquiries to
C. A. S. ENGINEERING CO.
Exclusive Representative
790 Woodward Ave., Detroit, Mich.

DETROIT TRAILERS

Sell on Design



It is not enough to buy or sell trailers alone on the assumption that they reduce cost and time of hauling. That fact is admitted.

It is more a question of buying—or selling—trailers that are designed and built to get the lowest operation cost results.

The Detroit Trailers are the last word in operating cost reduction. A glance at these illustrations proves that they have peculiar construction details, such as are not found on ordinary wagon trailers.

And these details actually make possible the hauling of a five-ton load at little over 10% of the operating cost of the truck itself. Sometimes ordinary trailers run this percentage as high as 60.

The Detroit Trailer has no side-sway, no rocking or longitudinal motion. Among the brief design reasons is a unique radius rod connection and method of converting drawbar torque. This arrangement, with our double acting springs, absorbs starting and stopping shocks. Observe how springs are suspended on a tension shackle. This means load-carrying duty only—no unnatural spring shocks.

Detroit Trailers sell on design and performance. We want to connect with dealers who are clear visioned enough to see this. Write for details.

1½, 3, 5 and 7 Ton Capacities Also Pole Trailers

Detroit Trailer Co., Inc
453-456 Stanley Ave.
Detroit Michigan
Canadian Branch: Walkerville, Ontario

AND PLENTY OF IT

Although power is always plentiful, it never runs wild. The New Stromberg Carburetor does not permit waste. The flow of force adjusts itself to meet requirements. There's no burning up of fuel that you do not receive actual *service* value for.

It supplies speed—power—pull and *plenty of it*—at most economical cost and least of mechanical troubles. In use on 41% of all listed truck models.

Write for literature.

Stromberg Motor Devices Co.
Dept. 336
64 East 25th St.
Chicago, Ill.

New STROMBERG Does it!
CARBURETOR

Daytona Beach, Fla., Feb. 18, 1919

DE PALMA—
PACKARD TWIN-SIX SPEEDSTER—
BETHLEHEM SPARK PLUGS

149.72 Miles Per Hour

—

Smash All World's Records

THE FOLLOWING TELEGRAM TELLS ITS OWN STORY:

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

RECEIVED AT

18P H 36

SEABREEZE FLA FEB 17 1919

THE SILVEX COMPANY

SOUTHBETHLEHEM PA

MY PACKARD TWIN SIX SPECIAL SPEEDSTER BROKE ALL WORLD BEACH RECORDS FROM ONE TO TWENTY MILES WITH THE SAME BETHLEHEM SPARK PLUG THAT I PUT IN MY MOTOR LAST MONDAY THEY NEVER MISSED ONE SHOT

RALPH DE PALMA

1211PM

BETHLEHEM LARGE HEX SPARK PLUG

⅞"—18 S.A.E.

Another BETHLEHEM Victory!

Miami Beach, Fla., Feb. 17, 1919
Hoosier IV, owned by H. R. Duckwall, won regatta and broke records in half-mile and twenty-mile events. Speed-boat Hoosier IV is equipped with 150 H.P. Sterling motor, using BETHLEHEM Spark Plugs.

THE SILVEX COMPANY

BETHLEHEM PRODUCTS **BETHLEHEM, PA.**

E. H. SCHWAB, President

GO where you will in our efficient new plant—you will find ***every*** process of production, ***every*** effort, ***every*** article of equipment working towards ***perfection of the finished product.*** Every machine operating with finest precision. Every workman a skilled mechanic. Every part of every Walker Truck Jack perfectly modeled—machined and ***finished.*** Labeled with lifting capacity—factory tested to lift ***more.*** ***Real*** Jacks. Smooth, easy, powerful, speedy in operation. Made in many different sizes—all possessing Walker superiority. Send for catalog whether you ***sell*** Jacks at wholesale or retail—or ***supply*** them with trucks.

WALKER MANUFACTURING COMPANY, 30 Hamilton St., Racine, Wisconsin

WALKER BADGER TRUCK JACKS

Oshkosh 4
2 Ton

Dealers Are Now Making Big Profits

by selling Oshkosh 4-Wheel-Drive Trucks to Customers who have been unable to get the service they needed out of any other type of construction. Oshkosh is the truck for unusual service—does what no other truck can do. And even in service which stalls other trucks, does its work on touring car operating cost.

You can say "yes"

—when your prospect asks for unfailing service through roads impassable to other trucks.
—when he asks for unusual load moving ability—hauling trailers for excess load.
—when he asks for 10 miles per gallon of gasoline and speed up to 16 miles an hour.
—when he asks for pneumatic tires for safe road speed.
—when he asks for complete equipment including every accessory necessary to afford the maximum in operating convenience and reliability.

This is worth your time to investigate. Ask for our dealer proposition.

Wheel-Drive Truck Capacity

Motor Truck Service for Owners has developed a *New Condition* in hauling. Motor Trucks are being called upon to travel over roads impassable to almost any other type of vehicle—hauling unusual loads—pulling trailers.

The Oshkosh 4-Wheel-Drive Truck meets every requirement.

Truck Owners Are Getting Real Results

from Oshkosh 4-Wheel-Drive Trucks under every conceivable kind of work.

Oshkosh is steadily maintaining a higher average rate of speed—in all general hauling—than other motor trucks of equal capacity.

It is steadily proving a lower operating cost.

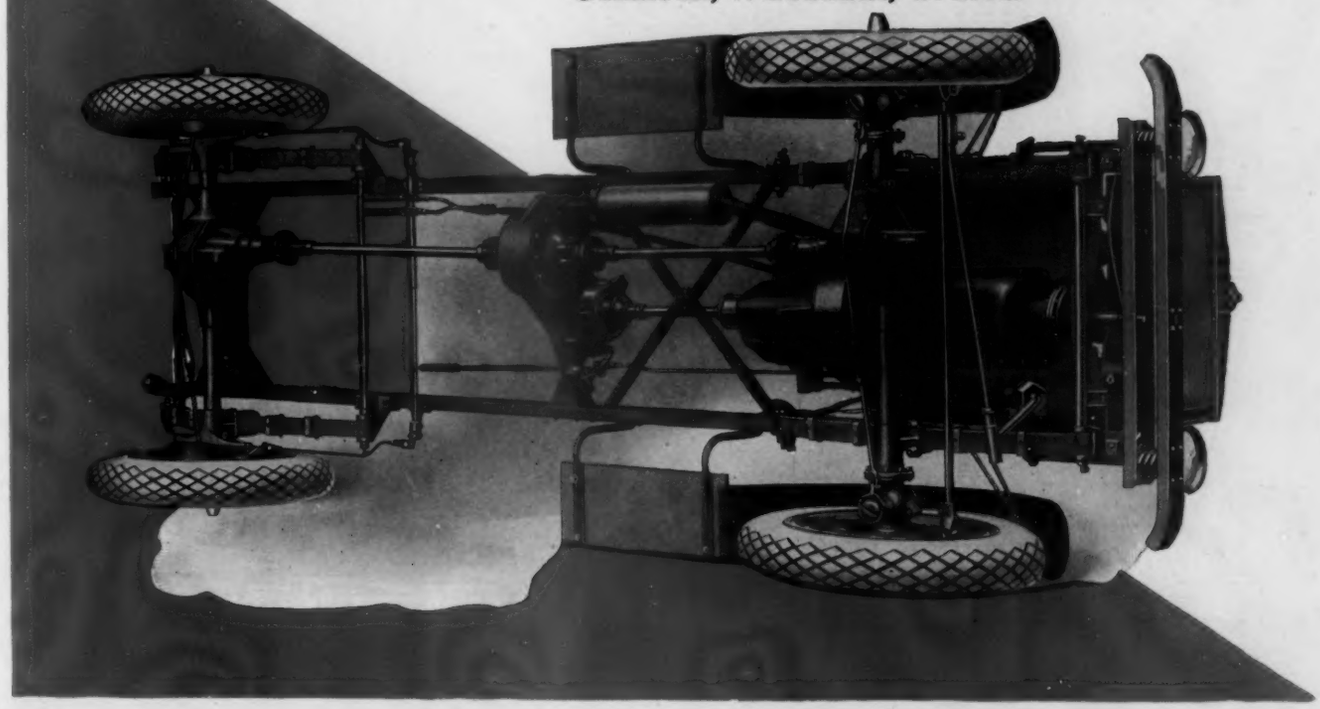
It is steadily performing at full load moving efficiency over roads where other trucks do not go.

It is proving superior ability in hauling Trailers.

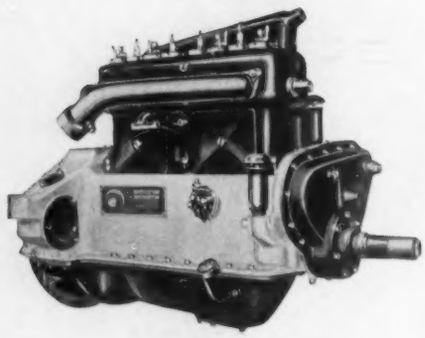
These are truck performance facts that you want to know about.

No other truck offers the complete specifications of the Oshkosh—North East Electric Starting and Lighting—36" x 6" Pneumatic Cord Truck Type Tires—Speedometer—Electric Horn—Complete Cab with Adjustable Windows and Windshield—4" Channel Steel Bumper.

OSHKOSH MOTOR TRUCK MFG. COMPANY
Oshkosh, Wisconsin, U. S. A.



Look for the Red Seal Continental Motor— It Assures You a High-Grade Truck



America's Standard Truck Motor. Look for the Red Seal Nameplate

The Continental Red Seal Motor enjoys the full confidence of truck and automobile buyers.

They know what this famous motor will do—know they can rely on it for power, for economy, for speed, for silence, for durability, for ***every*** motor quality. They look upon the Red Seal as a guarantee against motor experiments.

The most convincing evidence of what a motor ***will do*** is the record of what it ***has done,*** and in this we find the reason why the public believes so implicitly in the Continental Red Seal Motor. Fifteen years of successful performance in hundreds of thousands of trucks and cars provides sure evidence of its worth.

Striking endorsement of this confidence of the public in the Continental is seen in the fact that today over 160 vehicle manufacturers use it in one or more models of their trucks and automobiles. Thus upon it they stake the success of their product and an investment of many millions of dollars.

When you buy a truck or automobile look for the Continental Red Seal on the motor—the mark of proved worth.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Michigan
Factories: Detroit—Muskegon

Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR TRUCKS, TRACTORS AND AUTOMOBILES

Kelly-Springfield
TRUCK
TIRES
KELLY-SPRINGFIELD

Feeding Time

Gilbert & Barker Oil and Gasoline Outfits

Whether you have one truck or a fleet of trucks, unless you have modern oil and gasoline handling outfits there is going to be waste of time—of oil—of labor and of money.

With Gilbert & Barker Oil and Gasoline Handling Outfits

waste of any kind is positively eliminated. A Gilbert & Barker Portable Gasoline Tank is quickly moved from truck to truck, filling the tanks with least possible delay—delivering just enough and no more.

A Portable Lubricating Oil Tank is equally rapid and efficient, and the large Storage Tanks with Self-Measuring Pumps (either gasoline or oil) take care of the main supply and are your assurance that you are receiving full value for the money which you have invested in gasoline and oils.

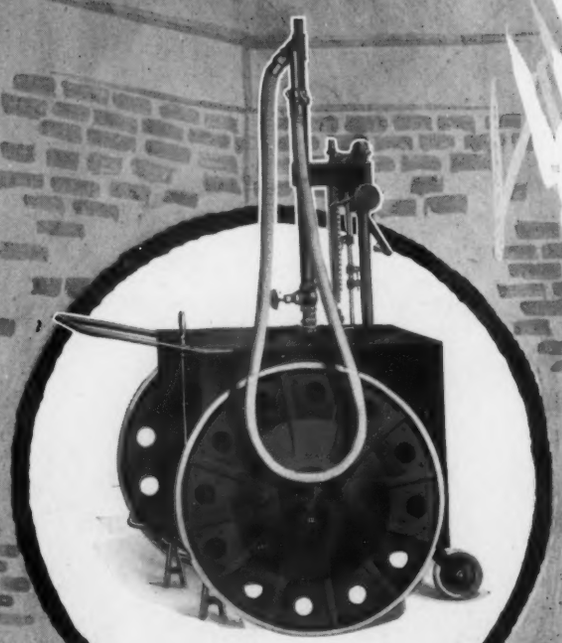
There is a Gilbert & Barker outfit to meet every condition. The initial cost is quickly absorbed by the saving of oils, gasoline and labor.

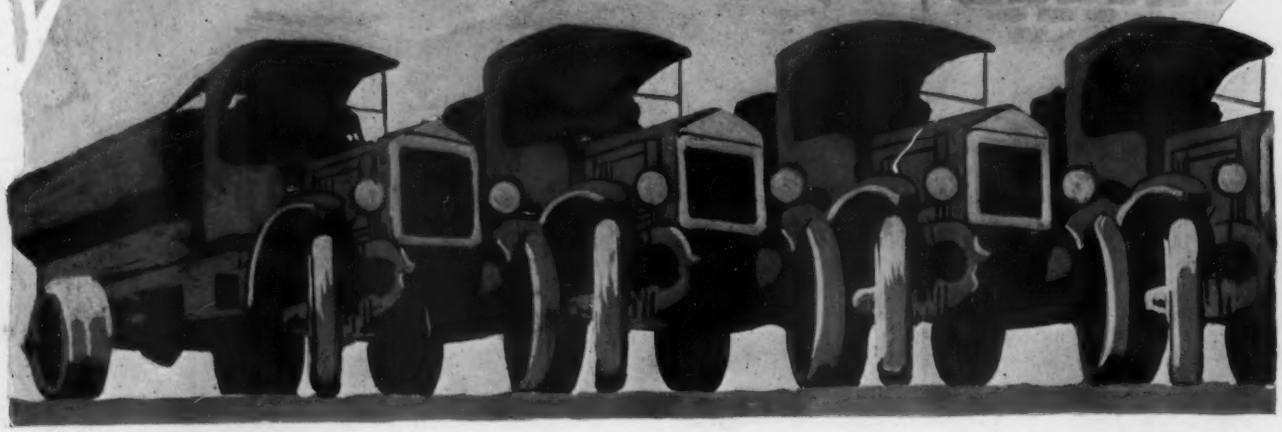
Bulletin 59 tells the story. Today is a better day than tomorrow—write

Gilbert & Barker Mfg. Co.

Established 1865

Springfield, Mass.





BABCOCK BODIES

Dealers' Profits

IN HANDLING THESE

BABCOCK FUNERAL BODIES

ARE ATTRACTIVE

WE OFFER
A COMPLETE LINE

Full Hearse, Combination and First Call (with Ambulance Equipment), all distinctively "BABCOCK" in Quality, Workmanship and Finish. They can be mounted on any suitable chassis. The less expensive styles have solved the used-car problem—*profitably*—for many a perplexed agent.

The demand for motorized equipment is already tremendous.

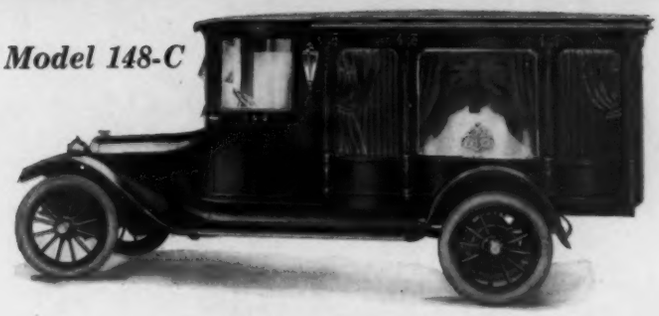
Your territory offers a market to be had for the asking.

Don't let the other fellow "beat you to it."

Investigation will promptly convince you.

Our literature and prices will be mailed upon request.

Model 148-C



Has Rich, Hand-Carved Quarter Panels With Broadcloth Drapes in Center

Model 145

Combination Body With Hand-Carved Quarter Panels

Model 146 **Combination Body With Plate-Glass Panels and Drapes**

H. H. BABCOCK COMPANY

WATERTOWN, FOUNDED 1845 NEW YORK.

OWEN TRUCK TIRES

Truck owners who have experienced annoying delays, due to tires opening at the splice, separating at the base, chipping and breaking, should try Owen long-service truck tires. The new modern method of manufacturing solid tires and the compounds used in Owen truck tires lessen these troubles.

Owen tires have an unusually tough tread that will not break down under the load. They wear down slowly and evenly, giving excessive mileage.

The remarkable resiliency of Owen tires cushions the load, eliminates shocks to the truck and saves in gasoline and repairs.

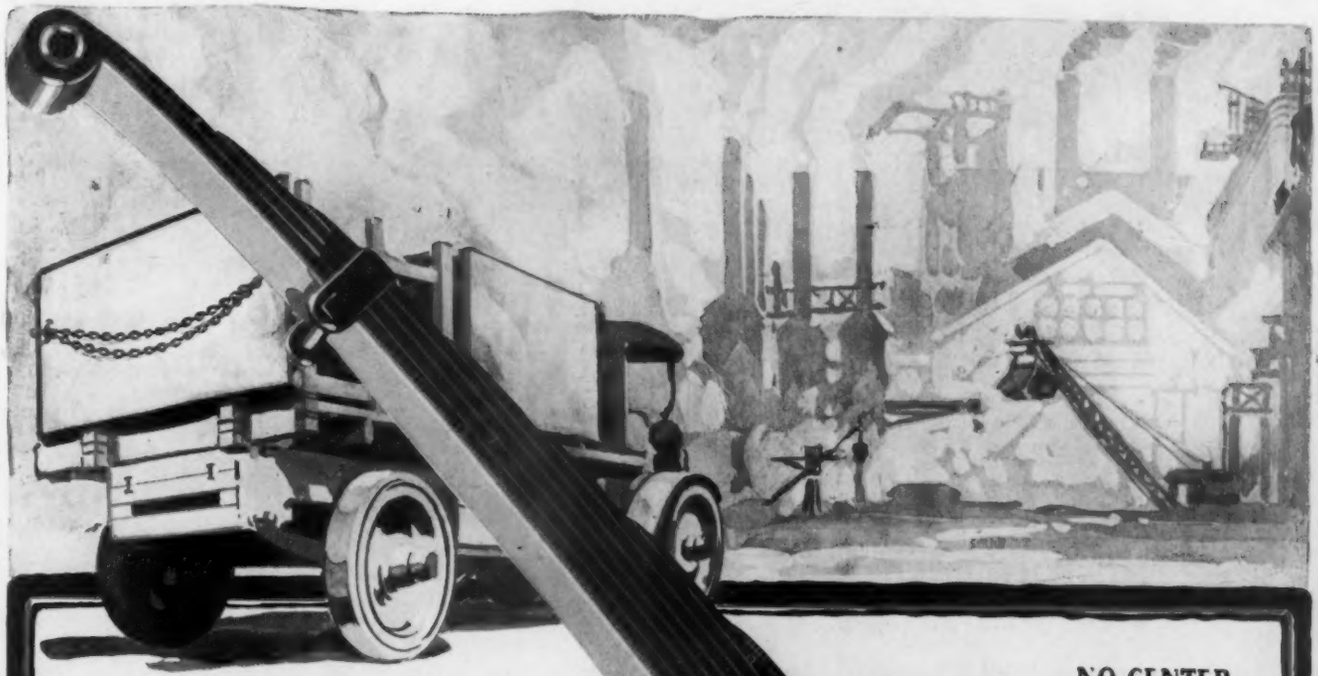
Owen tires are made in two types, the "Standard," or regular tire, and the "Titan," or high crown tire.

Try One and You'll Always Run on Owen Truck Tires.

Dealers: Write or wire for the Owen exclusive, co-operative agency proposition.

THE OWEN TIRE & RUBBER COMPANY

Executive Offices: 2336 Euclid Avenue, Cleveland, Ohio **Factory: Bedford, Ohio**



Trustworthy Spring Construction Helps Cut Trucking Costs

Equip a truck—*any* truck—with Higgins Quality Springs and you'll find *this* every time—load capacities are increased—mechanism is less affected by road shock—there are fewer delays, due to breakage and imperfect operation of engine parts.

NO CENTER HOLE, BOLT OR HUMP

—

NO DANGER OF BREAKAGE IN ANY SECTION

HIGGINS QUALITY SPRINGS

for all PASSENGER CARS AND TRUCKS

are absolutely *trustworthy*. From tip to tip there is no possibility of spring breakage. Their superior strength, acquired through our exclusive heat treatment of toughest motor car spring steel and their *scientifically* proper form of construction—no center hole, bolt or hump—takes the smash of road and crush of load without *weakening*—without jolting life out of machinery.

Manufacturers of Trucks will find the trustworthiness of Higgins Springs a valuable ally in furtherance of Truck sales through buyer's satisfaction. Send in specifications of your needs for price quotations and descriptive matter.

Operators of Truck fleets will find Higgins Quality Springs, as equipment or replacement, a splendid aid in reduction of trucking costs. Catalog upon request. Write for it.

HIGGINS SPRING & AXLE COMPANY

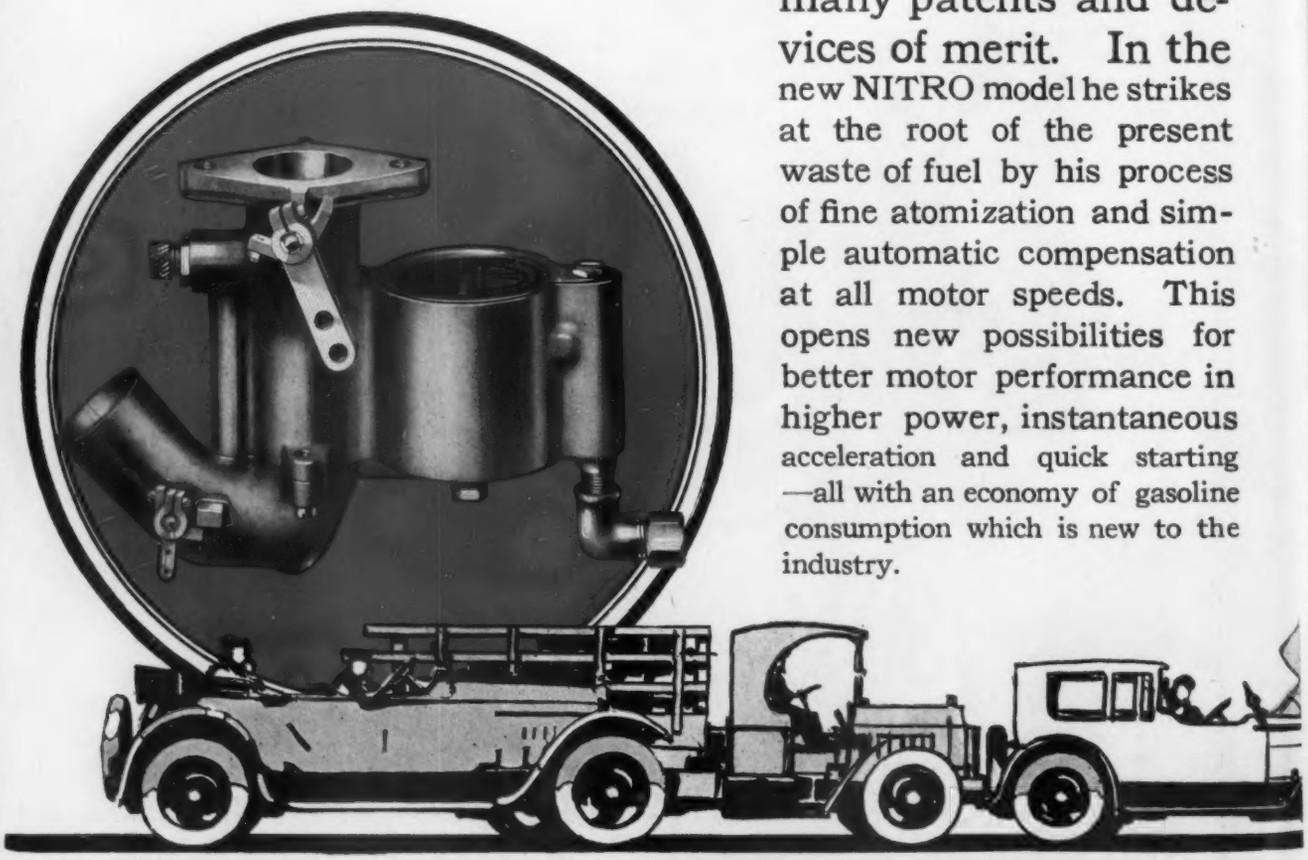
Dept. 319 **RACINE, WIS.**

NITRO
SUNDERMAN
CARBURETOR

This New Principle Carburetor

is designed from thirty years' practical experience in carbureting gasoline engines for more power and more miles

CAPTAIN Sunderman's experience antedates the advent of the automobile industry by many years' work on marine gas engines. His experience has been thorough and his research in the carburetor field has resulted in many patents and devices of merit. In the new NITRO model he strikes at the root of the present waste of fuel by his process of fine atomization and simple automatic compensation at all motor speeds. This opens new possibilities for better motor performance in higher power, instantaneous acceleration and quick starting —all with an economy of gasoline consumption which is new to the industry.



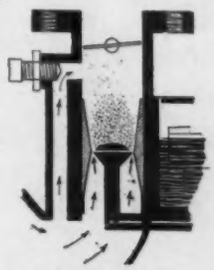
NITRO
SUNDERMAN
CARBURETOR

The keynote of NITRO success lies in its high velocities at low suction and its moderate velocities at full motor demand.

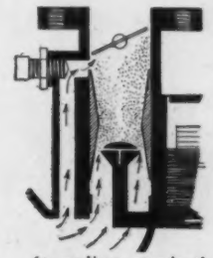
Combine this ideal with a true atomizing nozzle in a compensating system that automatically runs from low rich to high lean and every desirable condition is covered. NITRO combines the best of the plain tube design with the best of the air valve type and avoids the limitations of both. The floating venturi accurately measures the motor demand instantaneously and compensates at once.

This result has been achieved in a design of real simplicity. Few parts and simple ones mean small need for service and permanent results. The one minor adjustment for the lower speeds is easily set and then forgotten. NITRO will give its best results continuously.

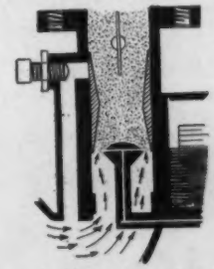
Manufacturers who are looking forward to progressive reconstruction along permanent lines of customer satisfaction should try NITRO for maximum results. The new era facing the industry calls for progress in every part. Try NITRO power.



At low speeds the venturi narrows the air space around the nozzle, thus increasing the air velocity.

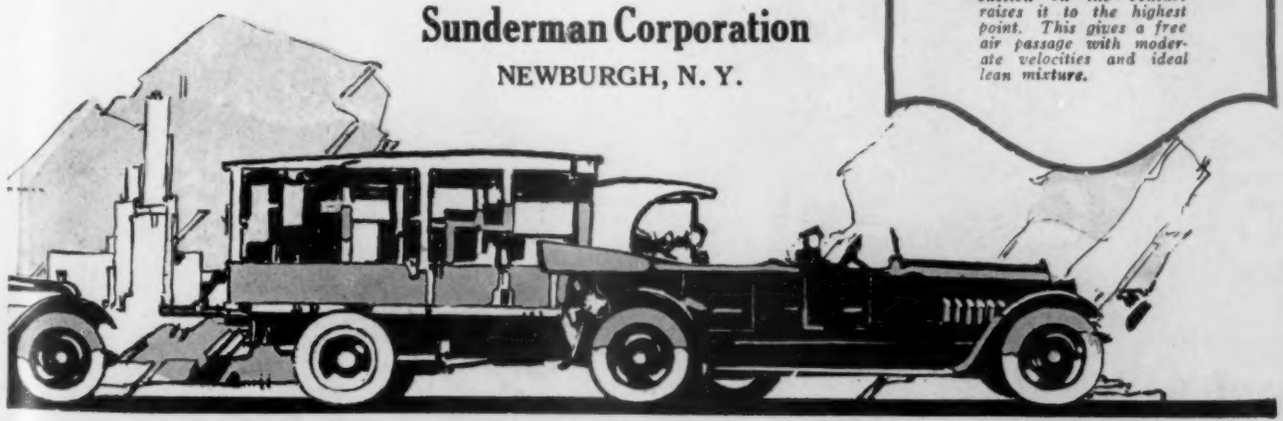


At medium speeds the venturi rises on the air stream, opening up the air passage and compensating correctly.



At high speeds the air by pass is shut off and full suction on the venturi raises it to the highest point. This gives a free air passage with moderate velocities and ideal lean mixture.

Sunderman Corporation
NEWBURGH, N. Y.



Obenberger
FORGINGS

Whether it be quality you seek, or accuracy of manufacture, or promptitude of delivery, or reasonableness of price you can find any or all in

OBENBERGER FORGINGS

We are prepared to satisfy your requirements on

Drop Forgings

Forgings Hammered from Billets

Try Obenberger Service and You'll be Pleased

JOHN OBENBERGER FORGE CO.

Milwaukee, Wis. **Plant, West Allis**

JOHN OBENBERGER FORGE CO. BETTER FORGINGS BETTER SERVICE MILWAUKEE WIS PLANT WEST ALLIS

THE MARK THAT STANDS FOR OBENBERGER SERVICE

Showing Body Designed for Farm Work

HAWKEYE
MOTOR TRUCKS

Make it possible for you to offer your customer this season a wonderful value for his money.

Motor—Buda 4-cylinder vertical, exceptionally heavy-duty, built specially for truck service.

Governor—Simplex, with a maximum speed of 16 miles per hour.

Oiling System—Positive pump system, with constant oil level pump mounted on side of crank case.

Carburetor—Zenith with automatic adjustment for all kinds of weather.

Ignition—Eisemann high-tension magneto.

Cooling System—Centrifugal water pump and 16-inch fan mounted on ball bearings.

Control—Left-hand drive, spark and throttle levers mounted under steering wheel. Foot accelerator, gear shift and break lever located to the right of the driver, in center.

Clutch—Fuller model TU 3, dry disc.

Radiator—Cellular, with cast shell. Mounted independently from hood.

Transmission—1½ ton, 3 speed, Fuller heavy-duty model TU 3. 2 ton, sliding gear, selective type, 4 speeds forward, 1 reverse.

Rear Axle—Clark internal-gear type.

Hawkeye Truck Co., Sioux City, Iowa

Hawkeye Trucks are built with a larger "factor of safety" than other trucks selling at a similar price. Each unit, each part, is gauged with every other part, forming an engineering product well balanced in point of endurance.

MADE IN TWO SIZES

1½ Ton and 2 Ton

R. A. BENNETT, President

Note what is given without extra charge, such as gas headlights, Prest - O - Lite tank, governor, metal dash, etc. — fixtures which are "extra" on most trucks.

DIETZ

WHERE you see good motor trucks there, too, you will find Dietz Heavy Duty Lamps.

For back of these present day Dietz Lamps dates an experience of 78 years. That's why they stand rough road treatment, why they burn well, and why they always look well.

Found by the thousands on such trucks as these:

Bessemer	Autocar	Lange
Day-Elder	Brockway	Moreland
Gramm-Bernstein	Clydesdale	Rochester
Indiana	Denby	Sandow
Republic	Service	Sanford
Schacht	Signal	Witt-Will
Selden	Triangle	Muskegon
Stewart	Victor	Tower
Acme	Winther	Hahn
Armleder	Hawkeye	Kleiber

AND MANY OTHERS

JAMES BARNES, *General Sales Agent for the United States*
CARTER BUILDING, ROCHESTER, N. Y.

R. E. DIETZ COMPANY, New York City

Largest Makers of Lanterns in the World

Founded 1840

Selden Trucks

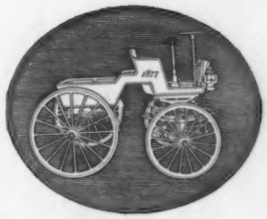
IN·BUILT QUALITY · SELDEN · MOTOR TRUCKS

The value of the Selden Dealer Franchise is well expressed by the character of Selden Dealers. Some of the largest and highest rated Distributors of Motor Trucks in the United States are Selden Dealers.

MITCHELL-SELDEN SALES CO.
CHICAGO

for instance

SELDEN TRUCK SALES COMPANY
ROCHESTER, N. Y., U. S. A.

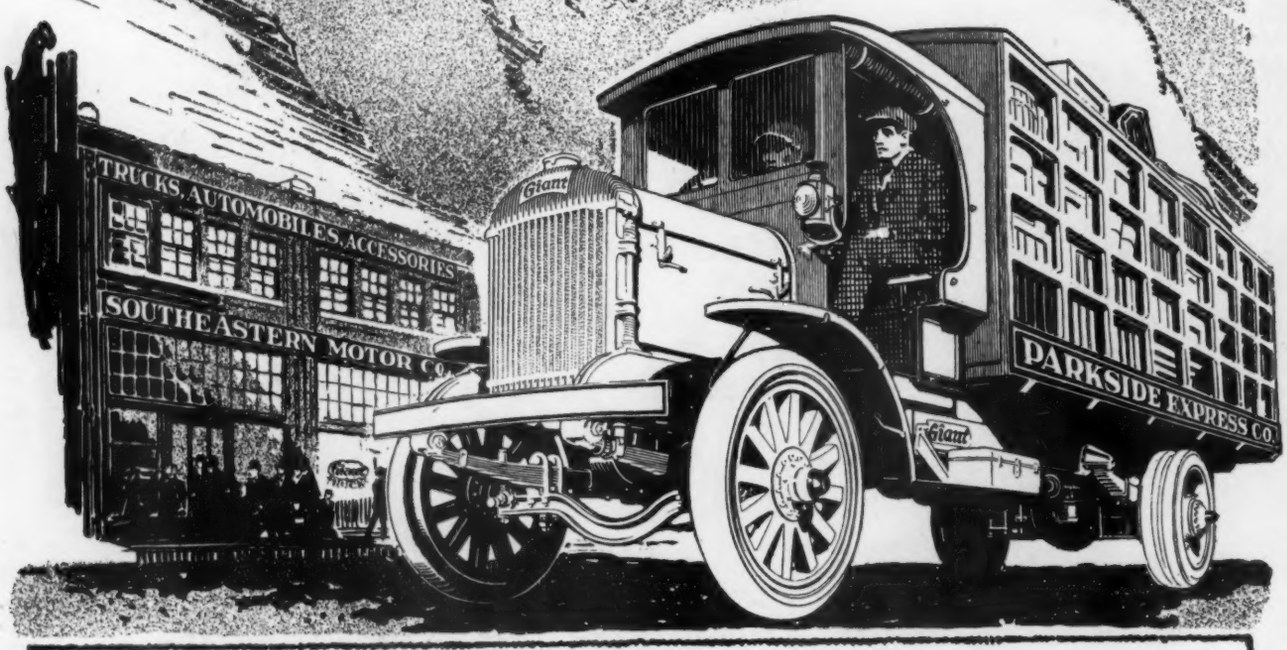


1877 - 1919

The first gasoline motor propelled road wagon was a SELDEN. *The present types of* SELDEN TRUCKS *are the result of years of continuous experiment, observation and experience in manufacture since the day of their inception in 1877.*

MITCHELL-SELDEN SALES COMPANY OFFICES & SHOW ROOMS, CHICAGO

a "Giant" on First Ave., Birmingham, Ala.



Southeastern Motor Co.

(Birmingham, Ala.)

Takes on Giant Line

SERIES IV

WITH greatly enlarged and remodeled quarters, the Southeastern Motor Co., of Birmingham, Ala., has fallen in line and taken on Giant Trucks—the first truck to burn low-grade fuels and prove it!

The Giant line is the livest truck proposition of today, because of exclusive features that answer the national needs of the times. One of these features is the device that enables Giant Trucks to

BURN LOW-GRADE FUELS

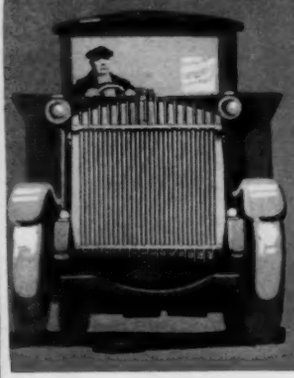
For Giant Trucks attain full power on low-gravity gasoline, or mixtures of kerosene or distillate with gasoline, reducing fuel costs as much as 50%.

Built and backed by the greatest tool-building organization in the world—highly standardized throughout—1, 1½, 2, 3½ ton models. Write or wire for complete dealer proposition.

THEY BURN LOW GRADE FUELS

Chicago Pneumatic Tool Co.

1031 Fisher Bldg. Chicago



G&O Radiators

20% GREATER COOLING AREA
How the SQUARE Fin Quickly Throws Off Heat

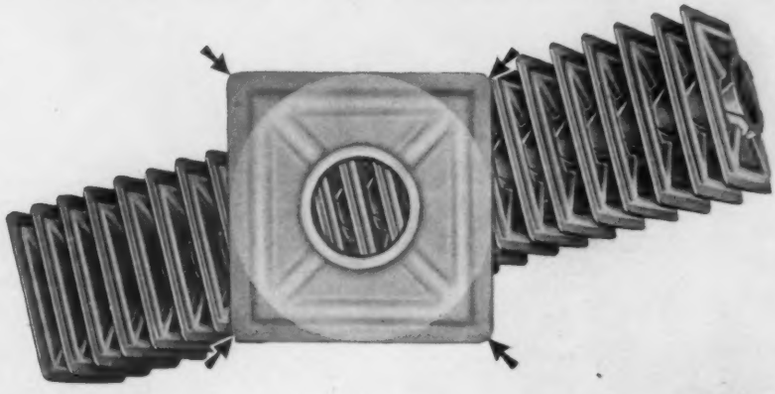


Illustration shows the increased area of the G & O Square Fin over the round types (indicated in phantom).

Additional surface means *additional* cooling efficiency.

The G & O Square Fin, plus the G & O Square Fin Shoulders (on each fin) provides the most advanced radiator design for heavy-duty service.

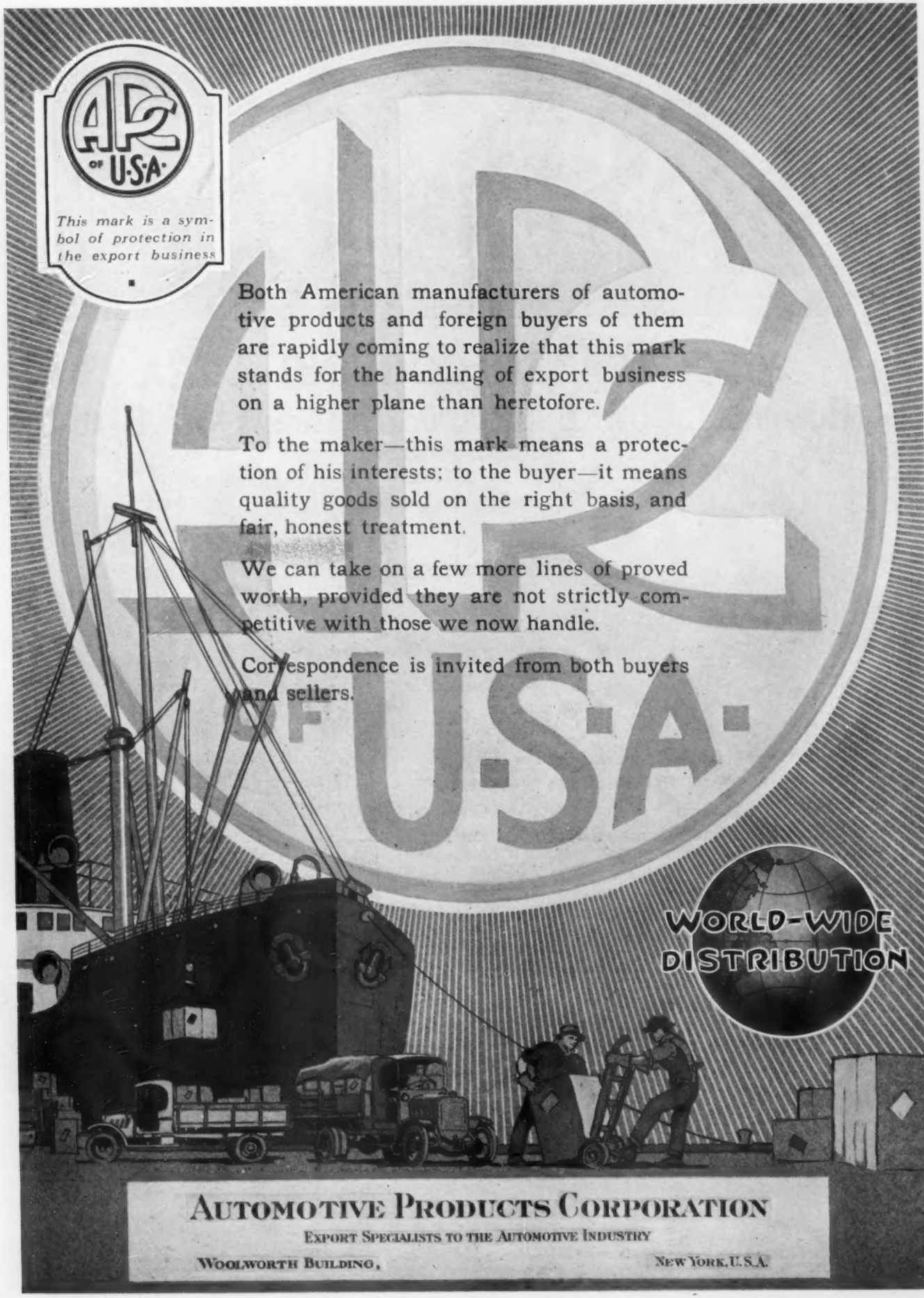
The Square Fin is an Exclusive G & O Feature

G & O Radiators have always been noted for excellence of materials and workmanship. The G & O Square Fin construction marks a decided step forward — further evidence of G & O leadership.

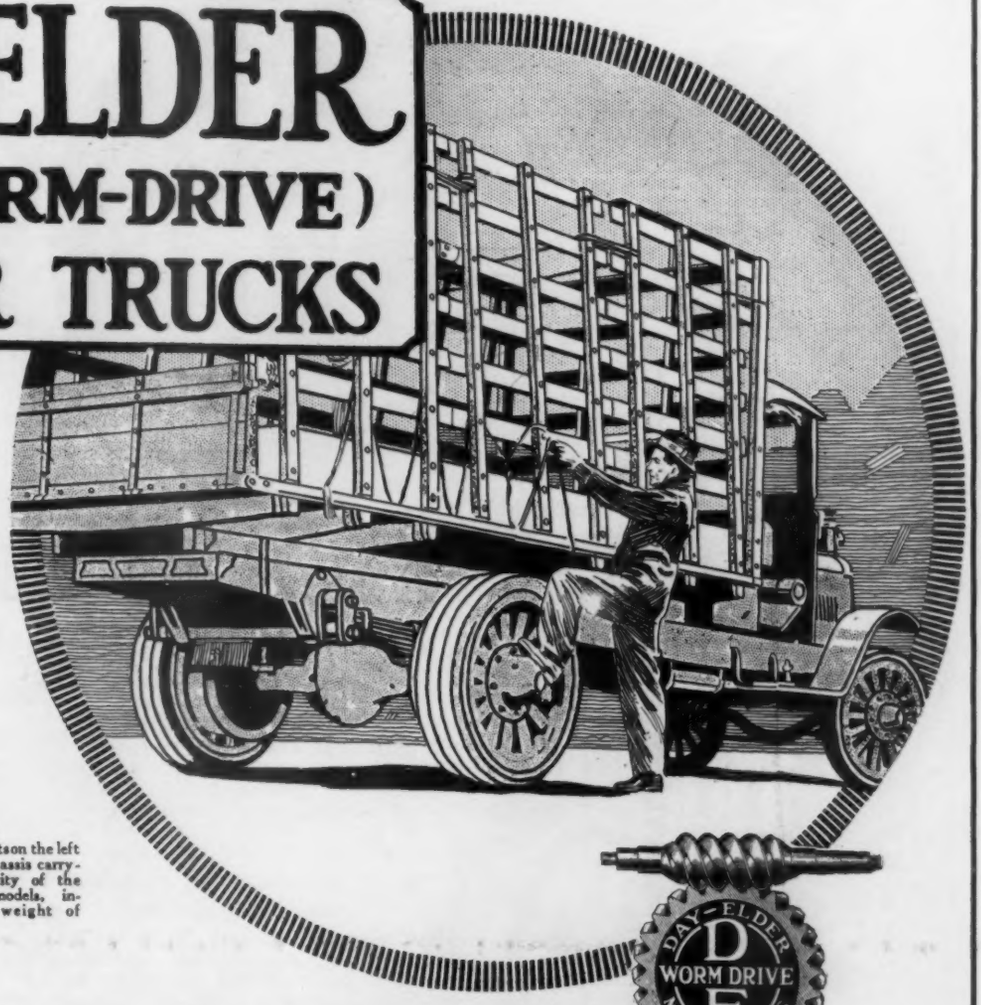
G & O Radiator with Square Fin Tubular Core

THE G & O MANUFACTURING CO., NEW HAVEN, CONN.

Essentially Heavy Service


APC OF U.S.A.
This mark is a symbol of protection in the export business
Both American manufacturers of automotive products and foreign buyers of them are rapidly coming to realize that this mark stands for the handling of export business on a higher plane than heretofore.
To the maker—this mark means a protection of his interests; to the buyer—it means quality goods sold on the right basis, and fair, honest treatment.
We can take on a few more lines of proved worth, provided they are not strictly competitive with those we now handle.
Correspondence is invited from both buyers and sellers.
WORLD-WIDE DISTRIBUTION
AUTOMOTIVE PRODUCTS CORPORATION
EXPORT SPECIALISTS TO THE AUTOMOTIVE INDUSTRY
WOOLWORTH BUILDING, NEW YORK, U.S.A.

DAY-ELDER
(D-E WORM-DRIVE)
MOTOR TRUCKS



Six Models

Model A
3500 Pounds
$1775

Model B
4500 Pounds
$2075

Model D
6000 Pounds
$2450

Model C
7000 Pounds
$2750

Model F
9000 Pounds
$3350

Model E
14,000 Pounds
$4500

The weights on the left are the chassis carrying capacity of the various models, including weight of body.

DAY-ELDER D WORM DRIVE E MOTOR TRUCKS

"The Best at Their Prices in America"

We claim to have no monopoly on quality nor a "corner" on materials—but we DO claim the distinction of building the BEST worm-drive trucks at their prices in America, bar none.

It is not necessary for us to go to any length in proving that statement; it is borne out more convincingly, more emphatically, in their *specifications* than we could hope to convey by argument.

The phenomenal success of DAY-ELDER Trucks—their triumphant sweep to the front—has not been achieved through the flare of advertising, but by the force of VALUE—of QUALITY—of PERFORMANCE.

There is no disputing their leadership; there is no gainsaying their worth. In any fair competition they almost invariably win. And they have a selling argument that is INVINCIBLE. Their nearest rivals cost *hundreds of dollars more.*

We have a very interesting proposition to make to a few more keen dealers. Communicate with us.

DAY-ELDER MOTORS CORPORATION

Newark, New Jersey, U. S. A.

A new kind of universal joint

It transmits power without jolts and jars

THE power that drives a car can also wear it out—if the car has an all-metal universal joint.

Until recently, engineers have tolerated a standard design of universal joint made entirely of steel. Although apparently correct in mechanical design, this type of universal joint has developed serious faults in practical use.

Why the all-metal universal joint is being discarded

An all-metal universal joint makes the whole drive shaft rigid and unyielding in the application of power from the motor to the rear wheels.

When the car is started too suddenly, the all-metal universal joint transmits the sudden jar through the differential to the rear axles by a direct metal-to-metal contact. As the metal universal wears loose, the power of the engine is applied to the rear axles with a sudden jolt that strains the driving mechanism of the car from end to end.

Likewise it transmits to the motor every road shock encountered by the rear wheels.

All-metal universal joints must be lubricated. Being inaccessible this is seldom done. Consequently they wear down quickly, become noisy, and develop loose play, which intensifies the jolts and jars that rack a car.

How the Thermoid - Hardy cushions the transmission and differential

This new universal joint is constructed of flexible discs which act as a cushion, protecting the entire chassis against the destructive jolts and sudden starting, and the continual succession of road shocks.

Needs no lubrication

Thermoid-Hardy has no metal-to-metal surfaces, and, consequently, requires no lubrication. When neglected by the motorist it never wears down and becomes noisy like the all-metal joint.

Motorists want this universal joint on their cars

Thermoid-Hardy Universal Joints have been thoroughly tested for years, in shops, in service and on the road. Several have given over 60,000 miles of hard service on both passenger cars and heavy-duty trucks, without reaching their limit of endurance.

Motorists are being shown, by a nation-wide advertising campaign, how this joint increases the value of their cars.

An interesting, understandable book on "Universal Joints—Their Use and Misuse" has been prepared to give dealers a more complete idea of what the Thermoid-Hardy Universal Joint will do. Send for your free copy.

Thermoid-Hardy Universal Joints carry our well-known guarantee: ***Thermoid-Hardy will make good—or WE WILL.***

Thermoid Rubber Company

Sole American Manufacturers

Factory and Main Offices: TRENTON, N. J.

New York Chicago San Francisco
Detroit Los Angeles Philadelphia
Pittsburgh Boston London Paris Turin

THERMOID-HARDY UNIVERSAL JOINT

Makers of "Thermoid Hydraulic Compressed Brake Lining" and "Thermoid Crolide Compound Tires"

The Dependable Worm Gear Refuses to be Noisy

Noise means wear, friction, lower efficiency. Quietness means absence of friction, delivery of maximum power and highest efficiency.

The advantages of Worm Gearing in permitting the use of a straight-line drive (no angularity power losses), and the fact that Worm Gearing is the only Gearing which shows an upward efficiency curve with use; the absence of upkeep expense; the **silence** and the cleanliness of the worm-gear drive appeal alike to the producers of highest grade trucks like Packard, Pierce-Arrow, Locomobile, Kelly-Springfield and Gramm-Bernstein, etc., and the quantity producers of efficiency light trucks, like Ford, Maxwell and Chevrolet.

The success of the worm gear as a final motor truck drive was just as pronounced in the business of war as in the business of peace. Merit alone is responsible for the fact that the use of worm gears in American trucks jumped from 11% in 1914 to 60% of all trucks in 1918.

As America's worm-gear specialists, operating the largest and only exclusive worm-gear factory in the United States, we stand ready to co-operate with you in your final drive problem. Our Engineering Department will always gladly work with yours.

Write us with reference to your final drive problem, whether it be Motor Truck or Tractor.

The Cleveland Worm Gear Company

America's Worm-Gear Specialists

Cleveland

C. F. Quicke & Co., 315 Euston Road, London, Eng. The Industrial Equipment Co., Oakland, Cal.

JUMBO

"The Oversize Truck"

Units That Everybody Knows

CAPACITY RATING—Two tons.

STANDARD EQUIPMENT—Chassis only, including seat and cushion, front fenders, runningboard, three oil lamps, horn, jack, tools and tool box.

WHEELBASE—Standard, 144″. Long, 168″. Tractor, 108″.

TREAD—Standard.

FRAME—Pressed steel, ¼″ stock, 208″ long, 34″ wide, 5¾″ deep. Five cross members.

TIRES—Solid. Front, 36″ x 4″; rear, 36″ x 7″.

WHEELS—"Prudden" wheels, 14 spokes, 2½″ square, front and rear. Guaranteed for life of truck.

MOTOR—"Buda," model H-U, four cycle, cast en bloc. Bore, 4¼″. Stroke, 5½″. Considered adequate power for trucks up to 5 ton capacity.

IGNITION—Eisemann G-4, high-tension magneto.

CARBURETOR—Zenith, fitted with hot-air attachment.

LUBRICATION—Positive force feed to all bearings. Gear pump.

COOLING—Centrifugal water pump.

RADIATOR—G. & O. cellular type, removable core

GOVERNOR—"Duplex" governor, driven from both motor and drive shaft, governing engine and vehicle speed independently.

FUEL FEED—Gravity, tank under seat. Capacity, 20 gallons.

CLUTCH—"Fuller," dry plate, multiple disc. Raybestos lined.

TRANSMISSION—"Fuller," selective type, sliding gear, three speeds forward and reverse. Gears and shafts made of 3½ per cent nickel steel and mounted on ball bearings. Unit with motor.

PROPELLER SHAFT—Three-joint type.

DRIVE—Hotchkiss type.

FRONT BEARINGS—"Timken" roller bearings.

REAR BEARINGS—"Hyatt High-Duty" roller bearings.

FRONT AXLE—Shuler "I" beam construction, drop forged.

REAR AXLE—"Clark" internal-gear drive.

GEAR RATIOS—High, direct, 9 to 1; intermediate, 15.3 to 1; low, 27 to 1; reverse, 31.5 to 1.

FRONT SPRINGS—"Detroit," half elliptic, 40″ long, 2½″ wide.

REAR SPRINGS—"Detroit," half elliptic, 54″ long, 3″ wide.

BRAKES—Service, external contracting. Emergency, internal expanding.

STEERING GEAR—"Jacox," block and worm type, adjustable for wear.

CONTROL—Left-hand steer, center gear shift. Hand and foot throttle.

FINISH—Standard Nelson grey. Chassis sanded, primed, painted, rubbed and varnished.

WITH THE Full-Year Guarantee

Every detail of the Jumbo assembly is designed and constructed far above the strength ordinarily considered adequate for a 2 ton truck.

This oversize construction naturally insures greater freedom from costly and troublesome breakdowns.

Jumbo trucks are built to "stay in service" and owners are driving Jumbos as high as 20,000 miles without spending one cent for repairs.

Upkeep and maintenance are both reduced to a minimum in the Jumbo as a direct result of quality construction, high standard of units and oversize strength.

Jumbo dealers are all building a big, profitable business upon the good will of satisfied owners. We back every dealer with real sales co-operation.

Write for territory

Nelson Motor Truck Company

SAGINAW, MICHIGAN

from Automotive Industries Jan 30th

Truck Transmissions

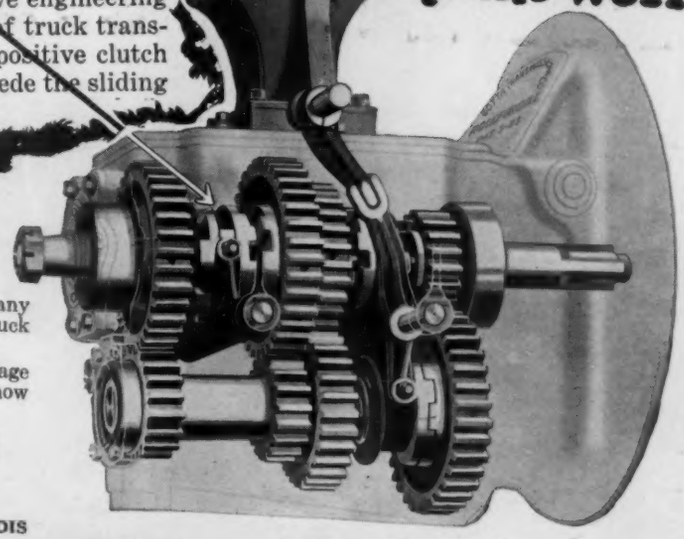
IT is generally known that the operating conditions affecting the change gear or transmission are much more severe on a truck than in a passenger car. Gears are changed much more on the truck, which has to operate a great deal in congested traffic; the truck is usually operated by a driver of little skill, and the weight which must be accelerated and decelerated if at the moment of meshing the two gears run at unequal pitch line velocities are very much greater than in a passenger car. Therefore the clashing of teeth where sliding gear transmissions are used is often very severe.

Various engineers in the past have held the opinion that the sliding gear could not be used successfully on trucks. This belief has been disproved by practice. However, we are now reaching a stage of development where it is not a question of what can be used but what is best under the circumstances. And we believe the time has come when the question must be squarely faced whether the jaw-clutch type of gear is not more satisfactory, all things considered. True, it increases the bulk and weight of the transmission, but the destructive clashing is eliminated and it can hardly be doubted that the life of the vital parts is prolonged.

Heretofore the positive clutch type of transmission has not figured very conspicuously in American practice, but as a result of the war and its lessons in regard to various features of design new departures in different branches of automotive engineering are imminent. Rumors of new types of truck transmission are rife. Can it be that the positive clutch type of transmission is about to supersede the sliding gear for truck use?

The final answer

Speed Changes Without Gear Shifting—Gears Always in Mesh—Powerful Jaw Clutches do the Work



A SALES CLINCHER

Cotta Transmission is the deciding factor in many a purchase. It is the logical transmission for truck and tractor service.

Up-to-date dealers will immediately take advantage of the Cotta national advertising campaign now running in The Saturday Evening Post.

Dealer poster, descriptive literature and names of trucks and tractors that are Cotta-equipped will be sent on request.

COTTA TRANSMISSION CO.
ROCKFORD ILLINOIS

COTTA
TRUCK-TRACTOR TRANSMISSIONS

MASON

Solid Truck Tires

are designed and built by the Master Solid Tire Builder of America. Their scientific construction gives resiliency without excess displacement that causes heat and disintegration; equal distribution of load on the base; no "cutting in" at the rim channel; other distinctive features that make them the most economical Solid tires ever produced.

We Want Distributors

and offer exceptional discounts. We have the plant and the organization to back up the efforts of those who grasp the remarkable opportunity presented by this superior tire and the market for it.

Write us.

Some excellent propositions also in Fabric and Cord pneumatics

THE Mason Tire & Rubber Co.

810 LAKE STREET KENT, OHIO

MASON MEANS MORE MILEAGE

These Men Are Responsible

They're the factory department heads.

They *know how* to make *good bushings*—and that is the *only* kind of bushing they do know how to make.

They make bushings *so good* that manufacturers who require bushings would, almost without exception, specify Bunting Bushings if they could buy them at *a price*.

As sellers of this product, our job is to show more users that it pays to have the best.

At that, Bunting Bushings are not expensive—the cost is less than a manufacturer's costs for making his own.

Bunting Bushings, by reason of a patented process, are hardened to wear more slowly.

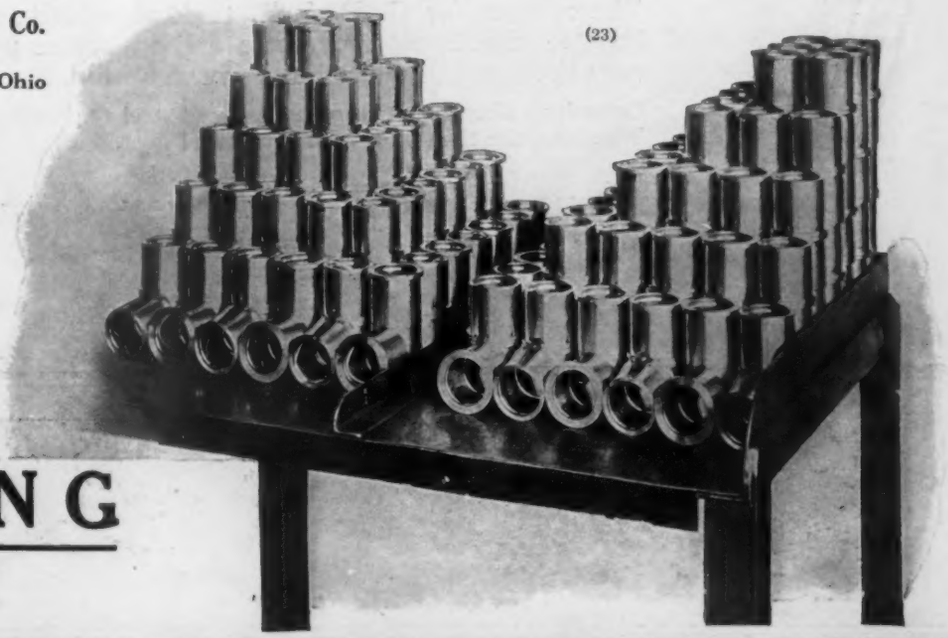
That they are your best buy is a statement backed up by the greatest production volume of bronze bushings in the world.

The Bunting Brass & Bronze Co.
744 Spencer Street
Toledo Ohio

Let us quote you on lots of 50 bushings or over. Your trial is our strongest proof

BUNTING

Bronze Bushings and Bearings
Patented



FIFTEEN ACRES TANK-MAKING FLOOR SPACE

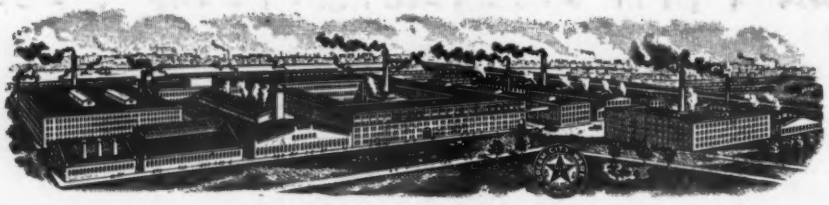
A Tremendous Organization

Perhaps nowhere else in the automotive field may be found such an array of men and machinery utilized in the production of tanks for automotive purposes. Our large number of customers has made such a plant absolutely necessary.

Here we can handle the production of gasoline, water and oil tanks for trucks more expeditiously than can the truck builder, at the same time releasing his floor space for more important work.

G. P. & F. tanks are sturdy and dependable. They are in design and construction practically leakproof, no matter how hard may be their stresses and strains.

They are essentially high service factors on trucks they equip.



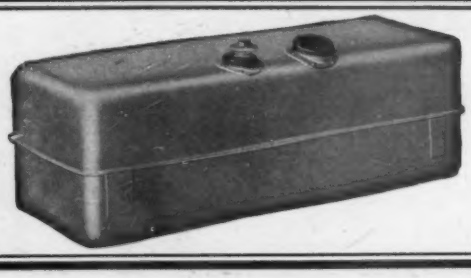
The reasons for G. P. & F. tank superiority are, briefly: Facilities, experience and insistence upon only the best in material and workmanship.

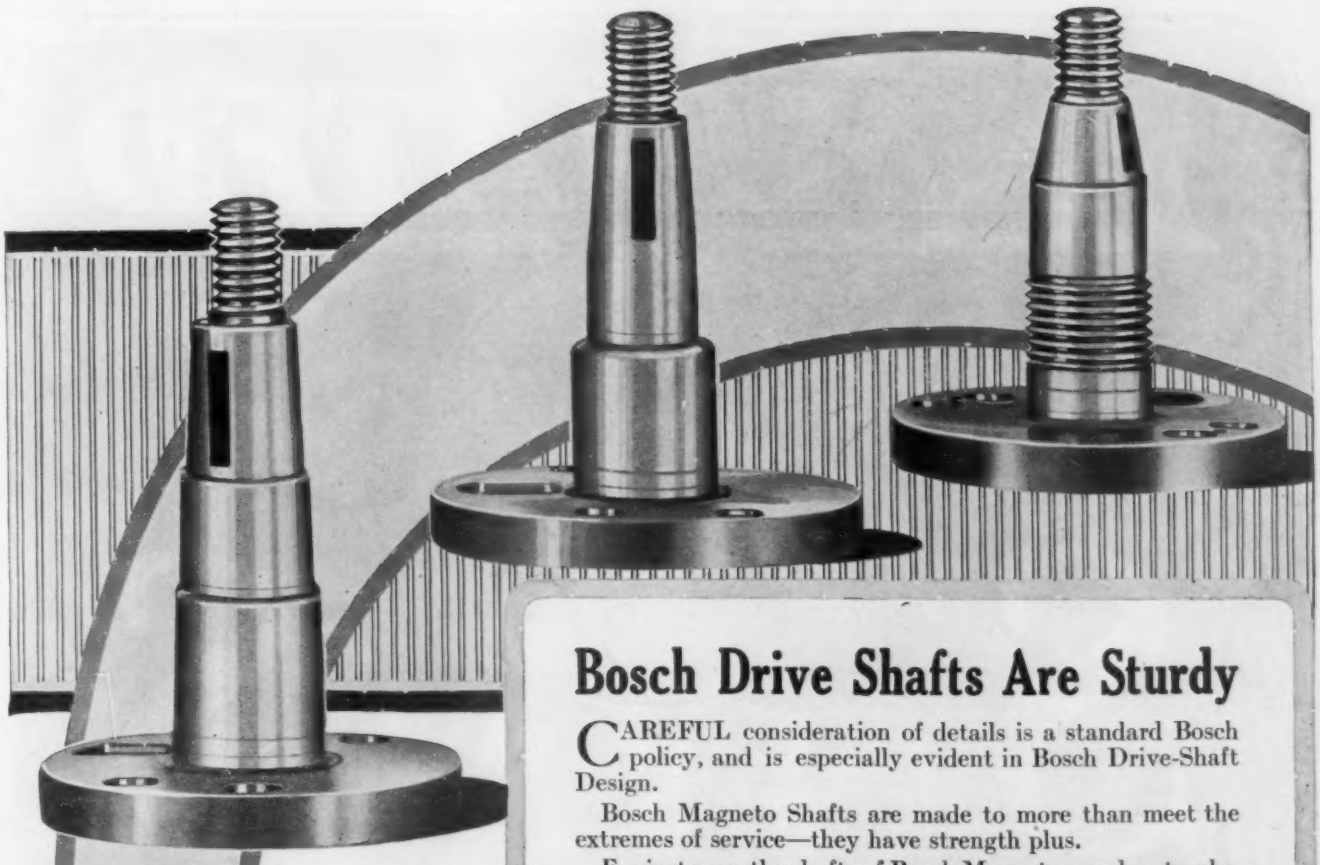
Consult us also in regard to your pressed-steel requirements. We also make the well-known Maxim Silencer.

Geuder, Paeschke & Frey Company

Canal Yards: Milwaukee, Wisconsin

G.P.&F. SERVICE
KNOWING HOW SINCE '81





Bosch Drive Shafts Are Sturdy

CAREFUL consideration of details is a standard Bosch policy, and is especially evident in Bosch Drive-Shaft Design.

Bosch Magneto Shafts are made to more than meet the extremes of service—they have strength plus.

For instance, the shafts of Bosch Magnetos used on trucks, tractors and airplanes are of greater strength than those used on motorcycles, the safety factor in each case being consistent with the condition to be met.

Bosch Shafts are accurately ground to finish, guaranteeing concentricity. Absolute accuracy in the setting of coupling members is assured in the ground finish of the taper seat. Couplings fitted to Bosch Magnetos run true—they never "wabble." There is no "whip" in the drive; no worn bearings, and no consequent shortening of the life of the ignition system.

Even the shaft threads and keyways are designed to more than meet overloads. Every detail has been considered to assure perfect performance at this, the vital point of every ignition system. For efficiency, dependability and long life—for that note of quality and confidence—specify Bosch on your orders.

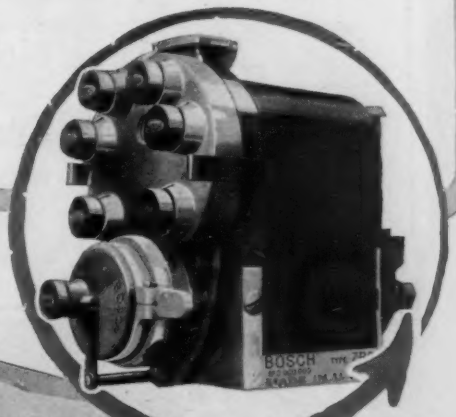
BE SATISFIED **SPECIFY BOSCH**

AMERICAN BOSCH MAGNETO CORPORATION

Main Offices and Works: SPRINGFIELD, MASS. Branches: NEW YORK, CHICAGO, DETROIT, SAN FRANCISCO—Service Stations in 200 Cities

AMERICA'S SUPREME IGNITION SYSTEM

MOTOR TRUCKS, TRACTORS, AIRPLANES, MOTOR CARS, MOTOR BOATS, MOTORCYCLES, GAS ENGINES, Etc.



No. 1
Inside Facts That Prove Bosch Supreme

BOSCH

AMERICA'S SUPREME IGNITION SYSTEM

MOTOR TRUCKS - TRACTORS - AIRPLANES - MOTOR CARS - MOTOR BOATS - MOTORCYCLES - GAS ENGINES - ETC.

©BOSCH MAGNETO CO. 1918.

LAMINATED SHIMS

Better Shims—Made Without Effort

LAMINATED SHIMS offer so many distinct advantages that engineers, manufacturers and repairmen have discarded the old-fashioned ***solid*** shim and the troublesome ***loose-leaf*** shim. LAMINATED SHIMS are fashioned as easily as lifting paper from a pad. No filing. No assembling. No wasted time and costly labor. Furthermore, a LAMINATED SHIM is mechanically accurate. There is no chance for human error. The adjustment is always accurate and smooth as glass. LAMINATED SHIMS help to keep the truck on the job.

Save Time, Money, Trouble—Use Laminated Shims

Laminated Shim Company, 533 Canal St., New York

DETROIT: Dime Bank Bldg. ST. LOUIS: Mazura Mfg. Co.

ENGLAND: R. A. Rothernel, 6 Great Marlboro St., London, W.

For Bearing Adjustments

The Seal of Dependable Performance

ACME THE TRUCK OF PROVED UNITS

Trade-Mark Registered U. S. Patent Office

(Acme 2-tonner owned by Roy O. Thomas, Bailey, Michigan)

Some Record—Even for an Acme

Mr. Thomas uses this truck in delivering fruit from his farm, and during off-seasons he has employed the truck in long-distance hauling work all over the state. Since October 9, 1916, he has driven the truck 16,700 miles and his repairs have cost him only $21.70.

It is performance records such as this one which make the agency for Acme trucks a veritable gold mine to live dealers. Acme produces in service and performance far above expected standards. It makes fast friends and keeps them. Every owner of an Acme truck is a prospect for another one and a big booster for more sales.

Write for our book, "Pointers to Profits," which tells you about the Acme, and ask us to send you our liberal money-making dealer plan.

ACME PROVED UNITS

The *WHY* of Acme success. Every unit standardized and endorsed by the greatest engineers of the industry.

Continental Red Seal Motor
Cotta Transmission
Timken Axles
Timken Bearings
Timken-Detroit Worm Drive
Borg & Beck Clutch
Heat-Treated Pressed-Steel Frame
Ross Steering Gear
Blood Bros. Universal Joints
Detroit Springs
Artillery Type Wheels
Eisemann High-Tension Magneto
Rayfield Carburetor
Stewart Vacuum Feed
Tubular Truck Type Radiator
Centrifugal Type Governor

Acme Motor Truck Co.

359 Mitchell Street, Cadillac, Michigan

ACME

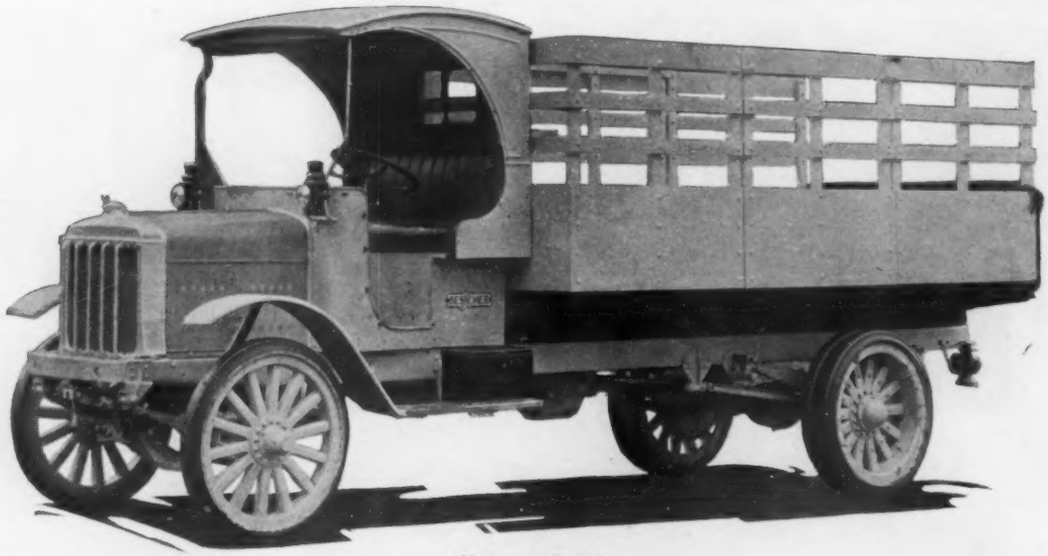
REG. U.S. PAT. OFF.

Built in one to five-ton models. Oversize in capacity and dimensions. Bodies built in our own factories.

Acme trucks are nationally advertised. This fact, combined with the universal satisfaction that Acme gives to owners, paves the way for Acme business everywhere.

Dealers who are on the lookout for a truck that stands head and heels above all others in performance will do well to get in touch with us on our dealer proposition.

A REAL TRUCK



2½ Ton Model

BESSEMER MOTOR TRUCKS

have made good in the oil fields

They got their start in the western Pennsylvania oil and gas region. This service is the most gruelling test that a vehicle can go through. They are loaded with 18 to 23 ft. lengths of heavy pipe or derrick material, which frequently overhangs so far at the rear that the additional weight of a man will lift the front wheels off the ground. They start from town on fair roads for any place in the mountains where the presence of oil may be suspected. The nearer the well they get, the less road there is. At the finish it is more than likely to be over the fields or through the woods to the well.

The sway and vibration of these overhung loads over roads (?)—often dry creek bottoms—produces the most violent strains imaginable in the truck structure, and a truck that stands up to this searching test year after year must be sound clear through. Some idea of the rigor of this service can be gleaned from the fact that a common commercial truck body will not stand the strains, and the BESSEMER has developed a special body, constructed of structural steel, which alone meets the requirements.

There is only one sales argument that is unanswerable—a succession of repeat orders covering a long period. The BESSEMER was born at Grove City, in the midst of the oil industry. For years this industry took its output. By ones and twos, many of the oil and gas companies have built up BESSEMER fleets, ranging from 10 to 35 trucks. There are perhaps two trucks of nation-wide reputation competing successfully with the BESSEMER in this field, *but the prestige of the BESSEMER for dependable performance in this service is unquestioned throughout the field.*

If the BESSEMER can deliver the goods in the oil fields, it can deliver *your* goods.

BESSEMER MOTOR TRUCK COMPANY

Grove City Pennsylvania

GRAY & DAVIS
Starting-Lighting System

The Gray & Davis Starting-Lighting System for commercial vehicles is considered an essential and up-to-date feature. The system greatly increases efficiency and materially lowers cost of operation. The Gray & Davis System, including lamps, is not a converted passenger car system, but is designed, developed and built to withstand severe usage—24 hours a day, the year 'round.

Gray & Davis, Inc., Boston, Mass.

-uniformity

ANSCO COMPANY

BINGHAMTON, N.Y., January 3, 1918.

RESEARCH LABORATORY

American Bronze Corporation,
Berwyn, Pennsylvania.

Gentlemen:

I am submitting below a short report on Non-Gran Bearing Bronze with a photomicrographic illustration. I am also sending separately a number of duplicate photomicrographs which you may find use for. These photomicrographs were made with the Silvermann illuminator. Some of the prints are darker than others in order to bring out the structure of the copper rich cores.

Very truly yours

Alfred B. Hitchins

REPORT ON NON-GRAN BEARING BRONZE

Recently a number of bronzes have been examined microscopically with a view to determining the uniformity of their structure and without doubt Non-Gran Bearing Bronze exhibits the most uniform formation of any of the bronzes examined. For the purpose of microscopic examination the bronzes were polished and then etched in the following solution:

Distilled water - - - - - 50 cc
Concentrated ammonia - - 35 cc
Hydrogen (15 vol.) - - - 15 cc

The etching was continued for 15 seconds. A photomicrograph (165 X) is attached to this report and shows the eutectoid constituents and the copper rich cores.. After the photomicrographic work had been completed the sample of Non-Gran Bronze was split up into portions and a series of chemical analyses were made. These resulted in a remarkable similarity of the chemical content of the alloy, further confirming the uniformity of the product.

HIGH SPEED
NON-GRAN
BEARING BRONZE

Made by
American Bronze Corporation
Berwyn Pennsylvania

A Truck of Long Proved Units

Schwartz Trucks are not experiments. Back of them stands a factory manned by engineering experts, and a force and equipment that have reduced their building to an exact science. Every unit assembled in these trucks has stood the test of time and will at once be recognized as the standard of its class.

Schwartz Trucks are noted for their mechanical efficiency, simplicity of design and the exceptional service given buyers.

SCHWARTZ HEAVY-DUTY TRUCKS

are built in 1½ and 2½ ton sizes. They offer an inviting prospect to dealers of the higher type—men who find pleasure and profit in handling trucks that make and keep friends.

TO EASTERN DEALERS

We can give you rapid fire deliveries on all orders. Our plant and equipment are able to offer model service in this particular. Also our factory is located in the heart of the East, giving a quick shipping radius of action in all directions, and this is a feature that counts heavily at this time.

Send for our proposition. It is interesting from your financial angle, and a Schwartz agency will insure you a business of rapid and healthy growth. Eastern dealers, in particular, should arrange for territory now.

Specifications

Continental (Red Seal) Motors—Their service value and efficiency need no comment. They insure power—and to spare.

Bosch Magnetos—A perfected instrument. The universally recognized leader.

Stromberg Carburetors—Hold the world's record for economical mileage.

Ross Steering Gears—Easily operated. Irreversible, safe and reliable.

Parish Mfg. Co. Frames—Heat treated. Highest quality material and workmanship.

Hartford Universal Joints—Maximum efficiency with great durability and strength.

Fedders Radiators—Used wherever absolute assurance of reliability is desired.

Brown-Lipe Transmissions—A guarantee of satisfactory performance.

Brown-Lipe Clutches—Perfected units.

Timken Bearings—Famous for their quality. Minimum friction. Adjustable for wear.

Schwarz Artillery Wheels—Made to stand hard service.

Torbensen Internal-Gear Axles—For superior efficiency and strength. Light unsprung weight. Low upkeep cost.

M & S Self-Locking Differential—Tires last longer because they never spin.

Schwartz Motor Truck Co., Reading, Pa.

Opening the Eyes of the World

Wood Hydraulic Hoist & Body Co.

DETROIT

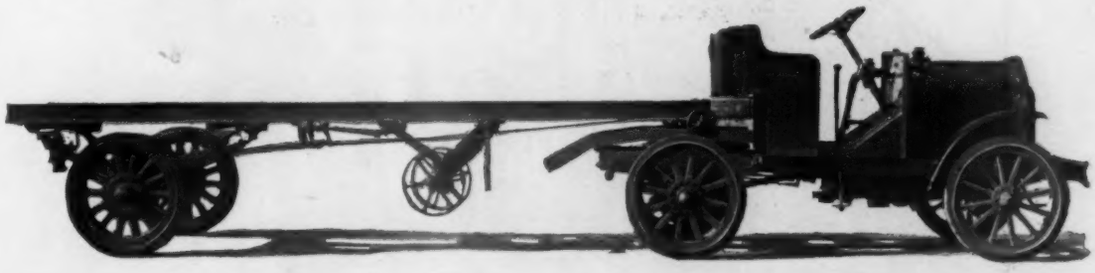
CHICAGO NEW YORK

LAPEER

TRACTORS and SEMI-TRAILERS

The 3 and 6 ton tractors we build are essentially for semi-trailers. They are short-coupled, sturdy and powerful heavy-duty tractors with a short-turning radius.

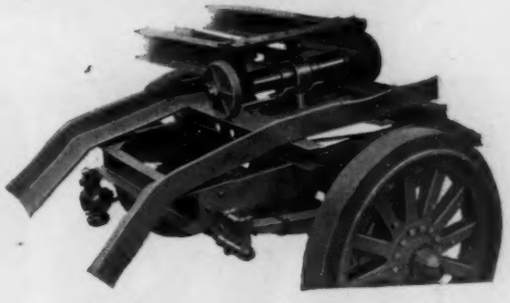
These tractors, in connection with the well-known Lapeer 2, 3, 6 and 7½ ton semi-trailers, offer hauling combinations of extraordinary service value—especially so in the larger communities where speedy and economical transportation is vital. Large center distributors will see the big possibilities in this combination.



These tractors and trailers are automatically coupled and uncoupled. In fact, this is the only semi-trailer on the market with this time and labor-saving feature. The inclined tracks shown on the fifth wheel carry the rollers on the front of trailer. When the truck backs up an automatic coupler with coil springs makes the connection. The wheeled leg is then raised, this at once releasing the trailer brake and locking the coupler. The Lapeer Automatic Fifth Wheel is the last word in trailer refinement.

Large Center Distributors

We offer a remarkable plan to distributors in important business centers all over the country. This tractor and trailer combination is a rapid seller on points of power, utility and durability. Write for full information.



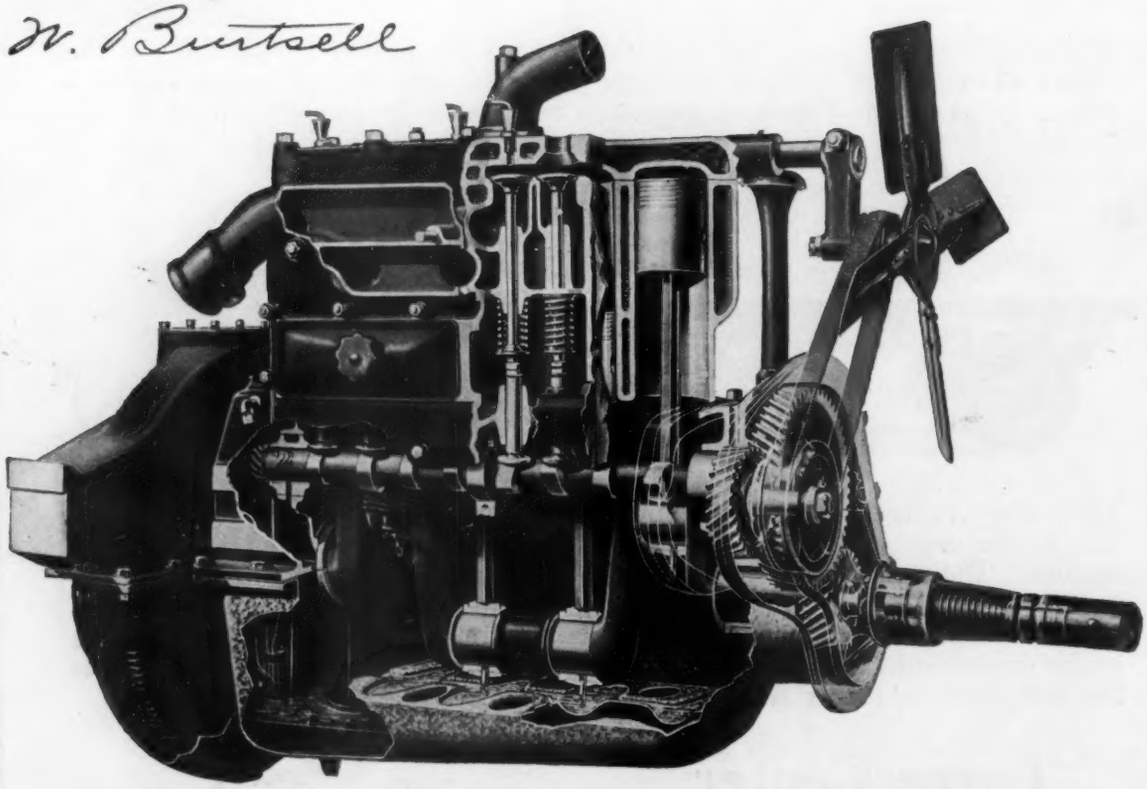
Lapeer Tractor-Truck Co.
Lapeer, Michigan

B. W. Burtsell

B. W. Burtsell

Newly-elected President and General Manager of the Herschell-Spillman Motor Company.

For six years Production Manager of the Packard Motor Car Company, and later Vice President and General Manager of the Gray Motor Company. Mr. Burtsell's well-known reputation as a producer of quality motors needs no affirmation on the part of the Herschell-Spillman Motor Company.



HERSCHELL

B. W. Burtsell
President and General Manager

E. O. Spillman
Vice President and Chief Engineer

T. J. Wilson
Ex-President and Chairman
Board of Directors

MOTOR

North Tonawanda

An Announcement

to the Motor Vehicle Trade of America

THE Herschell-Spillman Motor Company announces that the forces of reconstruction have been at work in our establishment at North Tonawanda, New York. The salutary changes resulting have strengthened our personnel, extended our resources, bettered our facilities. Our well-known high standard of quality alone remains unaffected.

In fact, what this reorganization achieves is the means to maintain the superior quality of "H-S" motors and, at the same time, to produce the quality. Our preparedness to supply larger demand is fully effected.

We are specializing on our four-cylinder motor, whose performance endorses it to all automotive vehicle makers. These motors are propelling many of today's leading cars, trucks and tractors.

We guarantee materials, workmanship, horse power and deliveries.

Inquiries Invited

-SPILLMAN COMPANY

New York

T. C. Perkins
Treasurer

M. J. Tovell
Assistant Treasurer

W. A. Moore
General Sales Manager

These chains are not "rubber gluttons."

They are so easily put on and taken off that even the most careless driver will remove them when they are not needed.

Standley Chains hang loose when they are idling. They move from place to place freely and cannot cut or bruise the rubber. Tire makers recommend the loose chain type.

Note the diagonal position they assume when pulling. This causes the wheels to work against the shoulders of the axles, holding the truck to road center. It also reduces the number of members ordinarily necessary for safety.

There is no slippage between chains—consequently no machinery jerking. One adjustment tightens all members.

Dealers: On these points alone Standley Chains outsell competition. Upkeep-cost-watching truck and fleet owners demand them. Write at once to your nearest distributor listed below:

Pittsburgh, Pa., American Sales Co., Inc., 334 2d Ave.
Western and Northern Pa., New York and New England States
Chicago, Ill., Gray-Heath Co., 1440 Michigan Ave.
Philadelphia, Pa., George W. Nock Co., Inc., 1304-06 Race St.
Louisville, Ky., F. J. Stubbs, 525 S. 3d St.
Toledo, Ohio, The Atwood Co., 1021-1023 Jefferson Ave.
Minneapolis, Minn., Snyder Automotive, Inc., 407-409 S. 10th St.
Kansas City, Mo., Welden Sales Co., 1603 Grand Ave.

STANDLEY SKID CHAIN CO., BOONE, IOWA

Factory and Main Office

Standard DETROIT USA SUCCESS IS BUILT ON SQUARE DEALING

THE Standard motor truck business is what it is today because of right design, honest and careful methods of manufacture and unswervingly square dealing with dealers and buyers.

Mr. Fisher, the owner of the business, early realized that success depended not only on building a good truck, but on having the good will of his dealer organization and of those who bought his trucks.

He, therefore, adopted a policy of absolute fairness to both classes—a policy to which he has since rigidly adhered. He plays no favorites, makes honest adjustments, allots trucks fairly and gives the small dealer the same kind of treatment and consideration he gives the big fellows.

It's a satisfaction for a man to handle trucks put out by a concern of that character. He knows he will get a square deal and knows he can honestly assure his customers of the same thing.

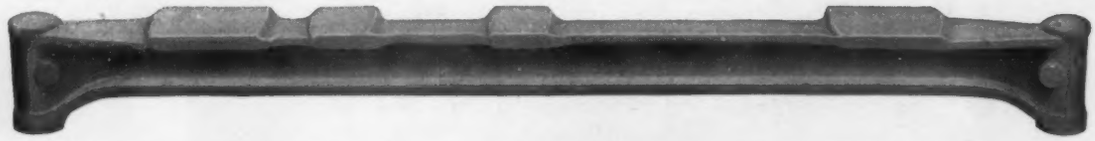
Good will is a priceless asset that's essential to success. The Standard Company seeks to secure and maintain the good will of all with whom it does business, by giving everybody a square deal.

How would you like to tie up with a company like that?

Standard Motor Truck Co.

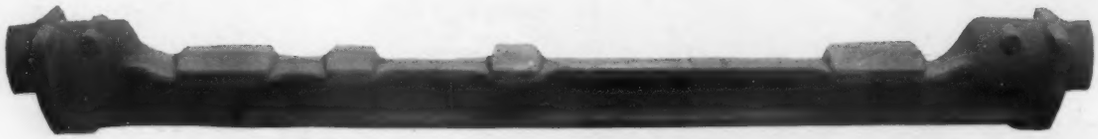
315 Bellevue Ave. **Detroit, Michigan**

DETROIT USA DETROIT USA



Front Axle for "Quad" Truck

Weight, 105 Lbs.



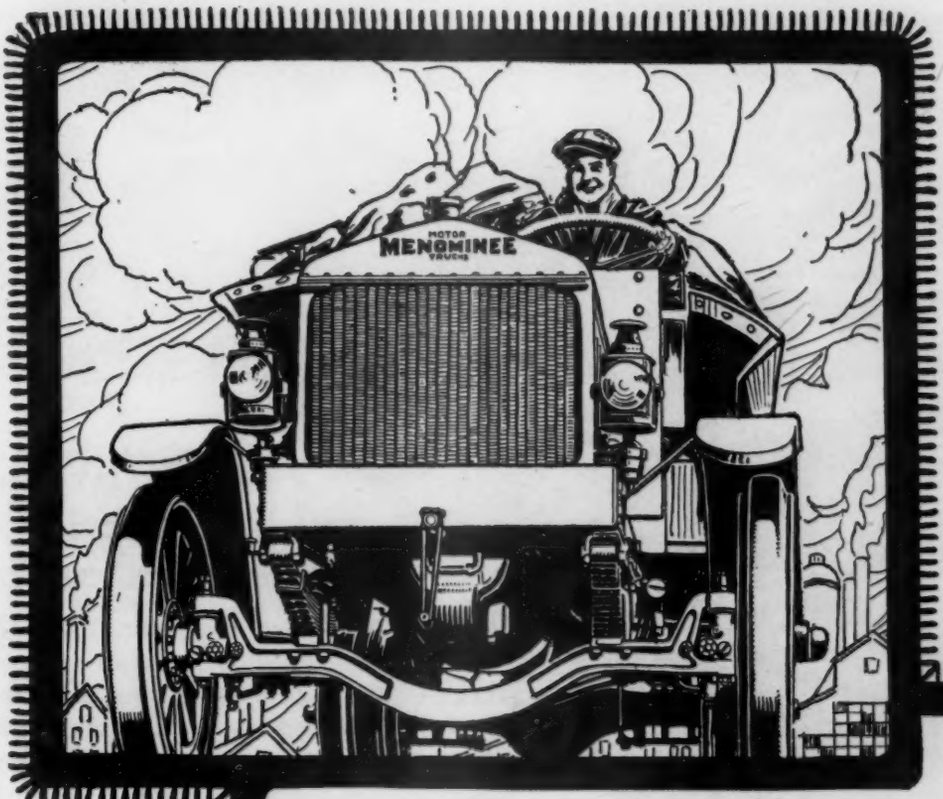
Rear Axle for "Quad" Truck

Weight, 140 Lbs.

Manufactured for the United States Government

ANDERSON FORGE & MACHINE CO.

Detroit **Michigan**



FOR downright, day-after-day dependability, for exceptional economy of operation and upkeep, for their ability to meet every condition of hauling and delivery problems

MOTOR MENOMINEE TRUCKS

have won enviable recognition in the field of commercial transportation. Built to fit a fixed purpose, they are pre-eminently the masters of the road and load. Embracing units of universally recognized standards, with added features of construction, Menominee Trucks insure a degree of efficiency as near 100% as is mechanically possible.

Buyers who appreciate the importance of having a truck that does not call for constant mechanical attention are sure to recognize the dominant advantages of the Menominee line.

We have a number of big business opportunities for aggressive dealers and distributors. Write

Menominee Motor Truck Co.

Dept. 10, Menominee, Michigan

One of the great Johns-Manville Asbestos Mines where fibre for Non-Burn Brake Lining is mined
Tons of run-of-mine fibre are sorted and resorted to get pounds of the best fibre for J-M Non-Burn
J-M NON-BURN
NON-BURN
ASBESTOS
BRAKE LINING
for your car

Truck Brakes and their relation to truck Maintenance Cost

Truck brakes have a responsibility that gets back to the vitals of your business. Accidents, cargo damage, and even lawsuits can all come out of faulty lining even when the truck is in control of the professional, eight-hour-at-the-wheel driver.

This is why you should buy lining on specification. The fact that Non-Burn is built to a specification is significant. Its selected Asbestos fibre sets a standard in lining fabric that means more mileage for your brakes—less maintenance on your trucks. Out of thousands of tons of Asbestos mined each year only the finest and strongest gets into Non-Burn.

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

And also through—

Asbestos

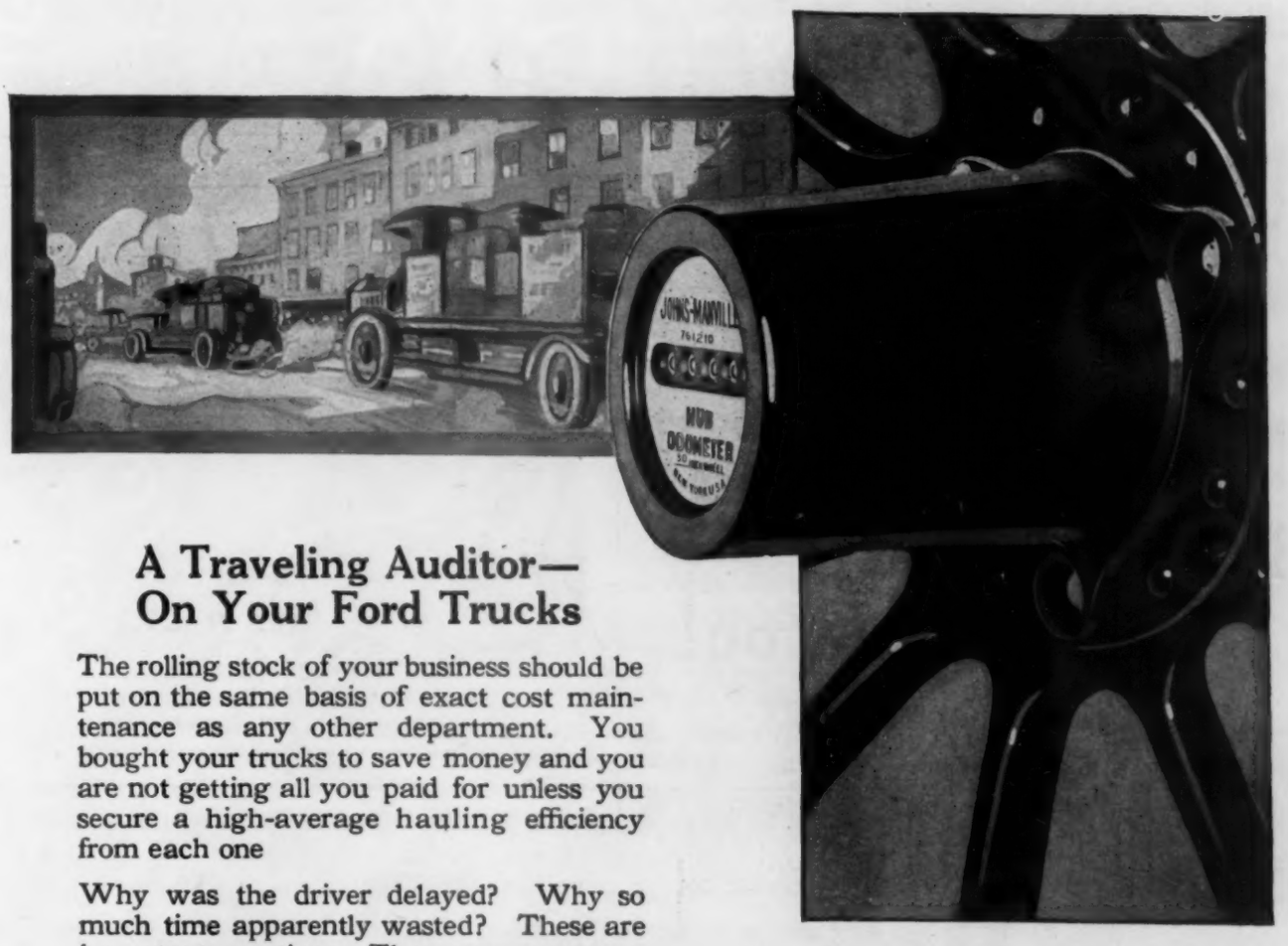
and its allied products

JOHNS-MANVILLE
Serves in
Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 63 Large Cities

JOHNS MANVILLE



A Traveling Auditor— On Your Ford Trucks

The rolling stock of your business should be put on the same basis of exact cost maintenance as any other department. You bought your trucks to save money and you are not getting all you paid for unless you secure a high-average hauling efficiency from each one

Why was the driver delayed? Why so much time apparently wasted? These are important questions. The answers are registered in your Johns-Manville Hub Odometer and become a part of your cost records.

The cost of Johns-Manville Hub Odometers is small and each instrument may save ten times its cost in one season. Modern business houses know the value of system, even in hauling—that's why they are buying the Johns-Manville Hub Odometer for Ford trucks. Put them on *your* trucks to show your costs.

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 63 Large Cities

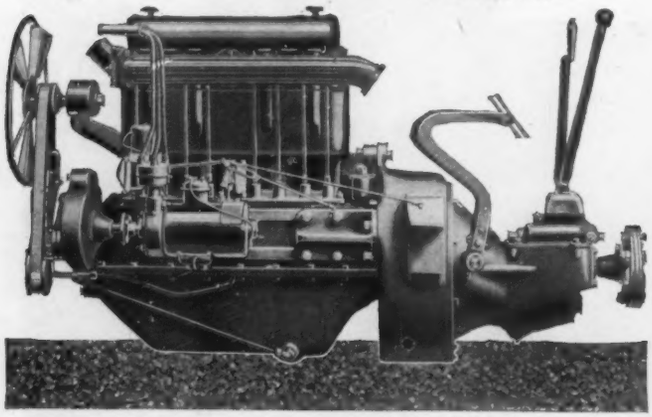
A Selling policy that is as popular as the Brake Lining:

In the realization that the success of Non-Burn lies as much with the trade as with the consumer, Johns-Manville have long since initiated and still rigidly maintain a Jobber-Dealer Sales Policy that is fair to all who handle Non-Burn or any other Johns-Manville Automotive equipment.

Distributing to dealers only through legitimate jobbers is a co-operative insurance that benefits jobber, dealer, and consumer. It has been our aim, not only to make the best lining but to market the best lining by the best method. Anyone using Non-Burn will admit the success of the former, and anyone handling Non-Burn will concede the latter

Automotive Equipment

3½ inch Bore, 5 inch Stroke
Overhead Valve



Now—
Ready for You!

This is the Matthews Motor that the U. S. Government selected for its Lighthouses, Wireless Stations and other war service where victory and human life depended upon infallible motor service.

You can have the same efficient service by using the same motors.

MATTHEWS Auto & Truck MOTORS

65,000 motors have been built by our organization to date—and they are making good not only on automobiles and motor trucks, but in general power service all over the world.

We can fit Matthews Motors to drive your pumps and machinery, operate your generators, hoists, and do all manner of special power work—put it up to us.

Prompt deliveries
Write for full information

The Matthews Engineering Co.
300 Monroe Street Sandusky, Ohio

HESSE

Reversible Trailers
Semi-Trailers
Pipe & Pole Trailers

Reversible Trailers Built in Five Sizes

Capacities: 1200 lbs., 2500 lbs., 3500 lbs., 6000 lbs., 10,000 lbs.

Bolsters with removable stakes for lumber hauling can be furnished on any style or size trailer

Pipe & Pole Semi-Trailers Built in Five Sizes

Capacities: 800 lbs., 1500 lbs., 2500 lbs., 4000 lbs., 8000 lbs.

Draw poles collapsible, range 8 feet to 16 feet between bolsters. Hesse rocking bolster furnished, when desired, for mounting body.

The perfect tracking feature of our four-wheel trailers makes them very adaptable for all kinds of road work

Any style body desired can be furnished

Write or wire us—your territory may be open

The Wm. G. Hesse & Son Mfg. Co.
Leavenworth Kansas

THE "SAFETY" WARNING SIGNAL

For Automobiles Trucks & Tractors

Prevents Accidents Like This

DESCRIPTION

Operates with the compression or explosion of cylinder.

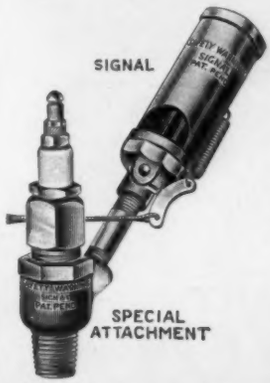
Can't break or get out of order, on account of its simplicity and all metal construction. Handsomely finished and nickel-plated.

No loss of compression. Carbon cleaner and scraper at opening or closing of valve an important *Patented* feature not contained in any other whistle.

No battery to depend on or wires to short-circuit.

May be installed on all make cars and trucks (no holes to drill).

Gives a warning above all traffic noise and commands instant attention.



APPLICATION

Simply and easily attached in place of priming cup on No. 2 cylinder. No tools but a plain wrench are required. A control cord runs from the signal direct to the steering column, within instant reach of the driver. The device is sufficiently small to be out of the way when working under the hood—and sufficiently strong to withstand ordinary accidental banging.

No attention required after installed. Always ready when needed.

Highest in QUALITY and EFFICIENCY. Cheapest in Price

Special Proposition to Jobbers, Dealers and Manufacturers

SAMPSTONE MANUFACTURING COMPANY

1607-09-11 PRAIRIE AVE. CHICAGO, ILLINOIS

Parish & Bingham

Pressed Steel Frames

From every angle of design preference, pressed steel frames for trucks are emphatically right. They combine these most desirable features—strength, durability and lightness.

Out of 199 steel frame models, "Parish & Bingham" is specified on 62, or nearly 33½%—this in a field supplied by 6 frame manufacturers.

We will design a frame over your own ideas and give you the approximate cost. Simply send description of trucks you are building or intend to build. Our engineering department will give you prompt service.

Automotive frames, brake drums and steel stampings of all kinds.

P & B

The Parish & Bingham Company
Cleveland, Ohio

Vertical Type Hydraulic Hoist

For all capacities

They are doing their BIT on U. S. ARMY TRUCKS

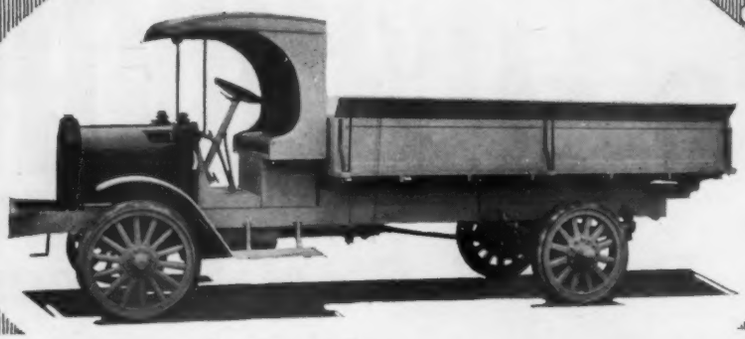
The only perfect dumping mechanism for motor trucks. Adaptable to all chasses

Write for descriptive matter and prices

THE HYDRAULIC HOIST MFG. COMPANY

292 Walnut Street **Saint Paul, Minnesota**

Columbia Trucks and Trailers



We have enlarged the fast-moving Columbia line. The sales of the well-known two-ton truck and six-ton trailer combination left no room for doubt as to the future success of a smaller capacity double unit.

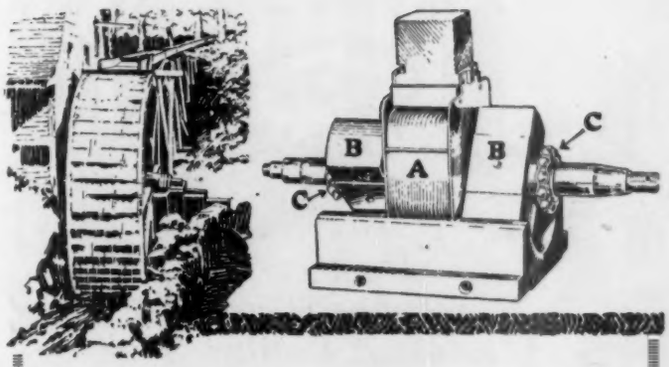
And so we are now delivering the Columbia one-ton truck "F" and also a three-ton tractor and trailer. Already sales records on these jobs are mounting rapidly.

Trailer selling is as much a part of the truck dealer's business as is truck selling alone. The big net profit end of the truck owner's hauling business is in the trailer. It pays the truck "overhead" and then piles up the earnings of the combination.

Write us for proof

Columbia Motor Truck & Trailer Co.

Pontiac, Michigan, U. S. A.



As Simple as a Water Wheel

The simplest form of power generation is the water wheel, which consists of a series of paddles mounted on a shaft, running in simple bearings, and requiring only an occasional oiling.

Like the water wheel, the K-W Magneto owes its reliability to this same, simple construction. The windings (A) are stationary, while the paddle-like rotor (BB) revolves in ball bearings (CC) and generates the current. Like the water wheel, the internal parts of K-W Magnetos need absolutely no attention, except for an occasional oiling.

There are **no** moving wires, revolving windings, troublesome commutators and brushes, current collector rings, etc., in this patented K-W construction. We thereby eliminate all internal sparking and trouble, due to sliding contacts and poor connections. In K-W construction all internal connections are **permanent.**

Don't put up with inefficient, troublesome ignition. Insist upon a

K-W High Tension MAGNETO

which requires no more attention than a water wheel—a magneto that is as efficient as it is reliable. There is a type for every make of tractor or truck.

Dealers and manufacturers should investigate the proven efficiency and reliability of the inductor design found in K-W High-Tension Magneto construction. Write for details—also a list of K-W equipped tractors.

THE K-W IGNITION Co.
2831 CHESTER AVE. CLEVELAND, OHIO. U.S.A.

"SERVICE"

"NORMA" PRECISION BALL BEARINGS

(PATENTED)

The period of reconstruction will still demand from men and from mechanisms, the capacity for super-effort. And under the stress of service the weak and inadequate fall by the way, while the capable come into their own with greater credit, greater recognition.

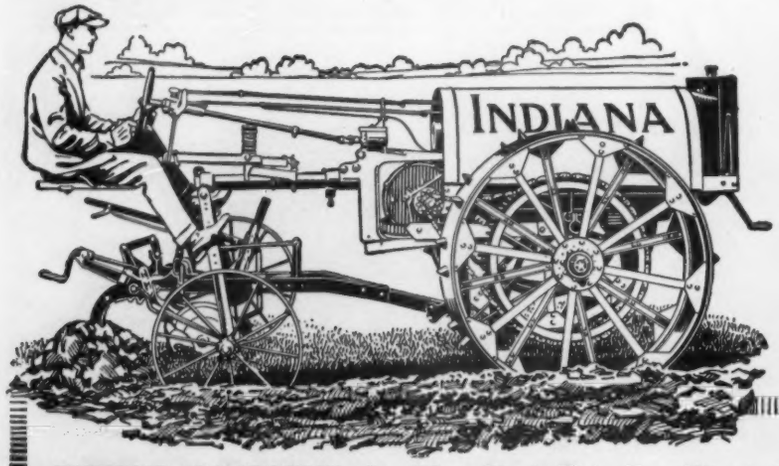
Peace-time demands find "NORMA" Ball Bearings, in ever-increasing numbers, meeting every emergency in the high-grade ignition apparatus and lighting generators used on cars, trucks, tractors, power boats and airplanes, in both civil and military service, in America and abroad.

Be *Sure*—See That Your Electrical Apparatus is "NORMA" Equipped

THE NORMA COMPANY OF AMERICA
1790 BROADWAY NEW YORK

Ball, Roller, Thrust and Combination Bearings

"NORMA"
PATENTED



INDIANA ALL-'ROUND TRACTOR

"The World's Tractor"

Here's the Biggest-Selling Easiest-Selling Tractor

AN ALL 'ROUND, One-Man, Single Unit, Two-Wheeled Tractor, that weighs no more than one large horse. A FAST AND EASY SELLER because—

It really replaces horses—does as much work as four horses at a saving of at least $450 a year under horse costs. Saves also the wages of one man.

It is used with regular horse implements—the ones the farmer already has. Requires no special hitching—no special equipment.

It is just the right size and power to plow, drill, harrow, cultivate, mow, rake, pull a binder, etc. There is no excess weight, no waste fuel.

Send for the folder that tells the facts and our *Big Money-Making Proposition* for Local Distributors and Exclusive Selling Territorial Arrangement.

The tractor for big and little farms. *Superior in every detail of construction. Low in price.* Address nearest office.

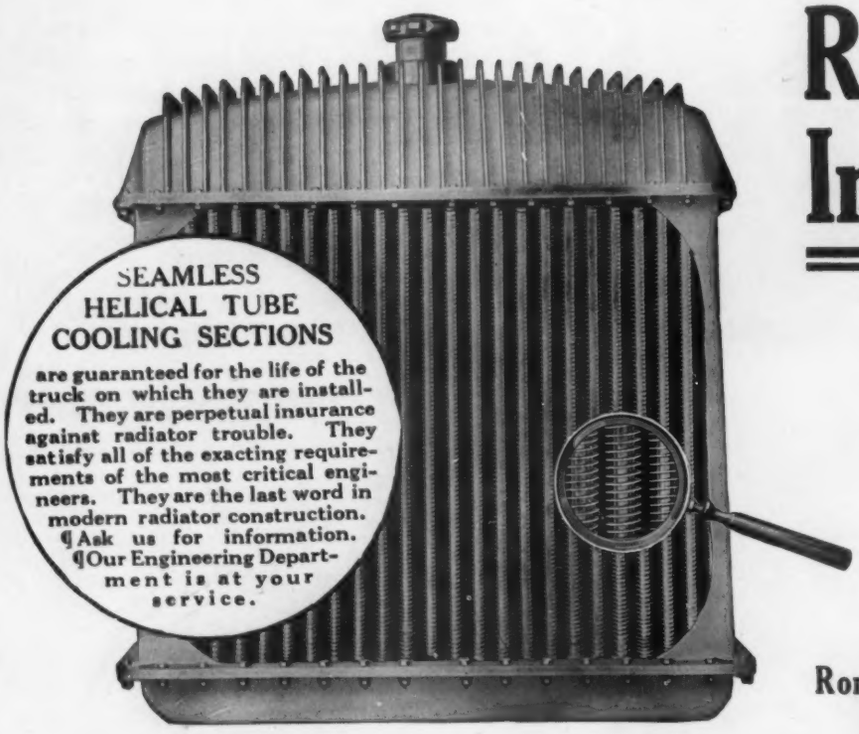
THE INDIANA SILO COMPANY

805 Union Bldg... Anderson, Ind. 805 Indiana Bldg..... Des Moines, Ia.
805 Silo Bldg... Kansas City, Mo. 805 Live St'k Exch. Bldg. Ft. Worth, Tex.

The company behind the Indiana Tractor has the best possible reputation with American Farmers everywhere. In every dealer's territory, our company has a high reputation and a great good-will, it makes the world's largest selling, and most successful Silo.

INDIANA SILO

If there is no local agent for the Indiana Silo in your territory we want to place one there. Indiana Silo dealers make more money than dealers in any other Silo—because the country over they make more sales. For 15 years it has been the biggest selling Silo. Exclusive territorial rights may be secured, Write now for the facts.



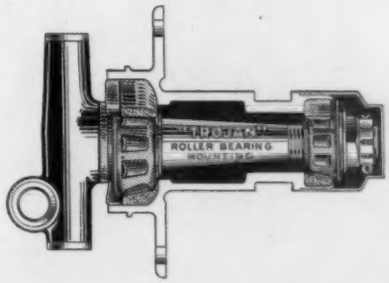
SEAMLESS HELICAL TUBE COOLING SECTIONS

are guaranteed for the life of the truck on which they are installed. They are perpetual insurance against radiator trouble. They satisfy all of the exacting requirements of the most critical engineers. They are the last word in modern radiator construction. ¶ Ask us for information. ¶ Our Engineering Department is at your service.

Radiator Insurance

Sole Manufacturers

Rome-Turney Radiator Co.
Rome, N. Y., U. S. A.



TROJAN TAPERED ROLLER BEARINGS

For Ford and Chevrolet 490 Front Wheels

The **Trojan Roller Bearing** is an exact replacement of the cup and cone bearings now used in the front wheels of the Ford and Chevrolet 490 cars. No machine work necessary to install.

Thousands of these cars, **Trojan** equipped, are giving more service miles today than ever before.

You also can enjoy the easy steering, increased tire mileage and perfect safety by installing these bearings.

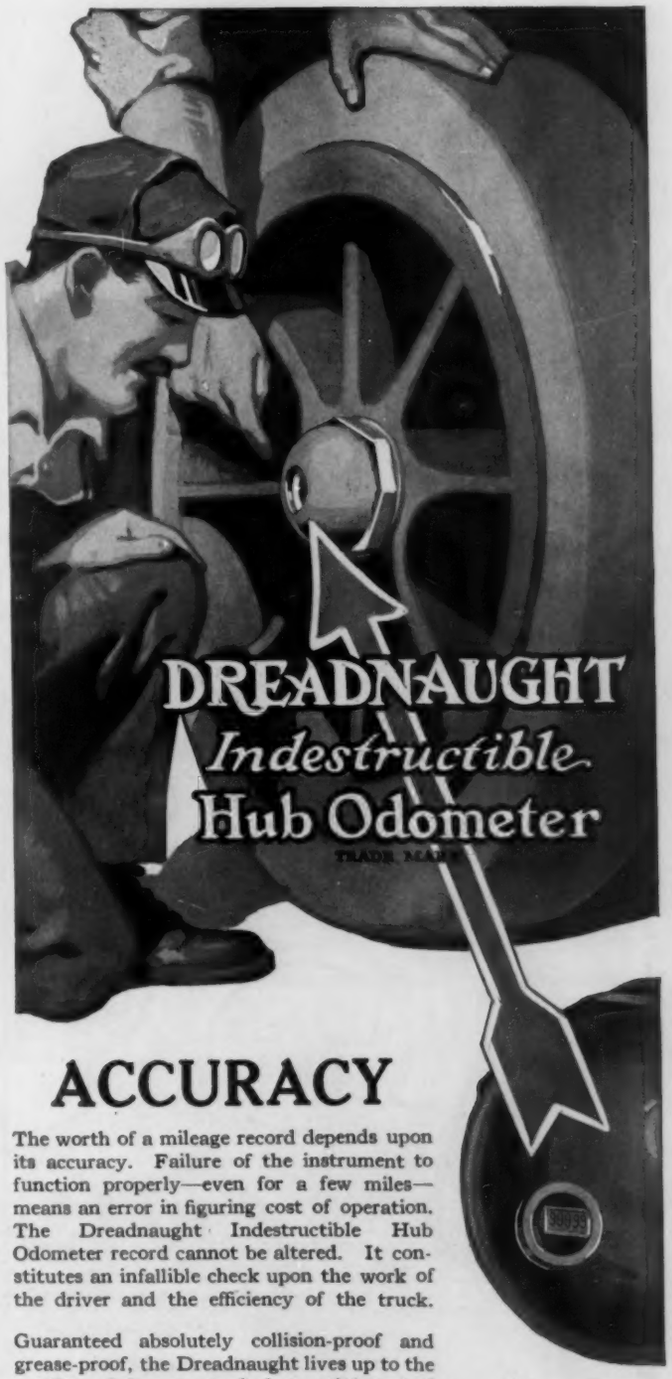
FIRST ON THE MARKET.

STILL IN THE LEAD.

AHLBERG BEARING CO.
2636 MICHIGAN AVE. CHICAGO, ILL.

	Branches:	
Atlanta	Los Angeles	Philadelphia
Boston	Minneapolis	Portland, Ore
Cleveland	New York	St. Louis
Detroit		San Francisco

Trojan TRADE MARK
ROLLER BEARINGS



ACCURACY

The worth of a mileage record depends upon its accuracy. Failure of the instrument to function properly—even for a few miles—means an error in figuring cost of operation. The Dreadnaught Indestructible Hub Odometer record cannot be altered. It constitutes an infallible check upon the work of the driver and the efficiency of the truck.

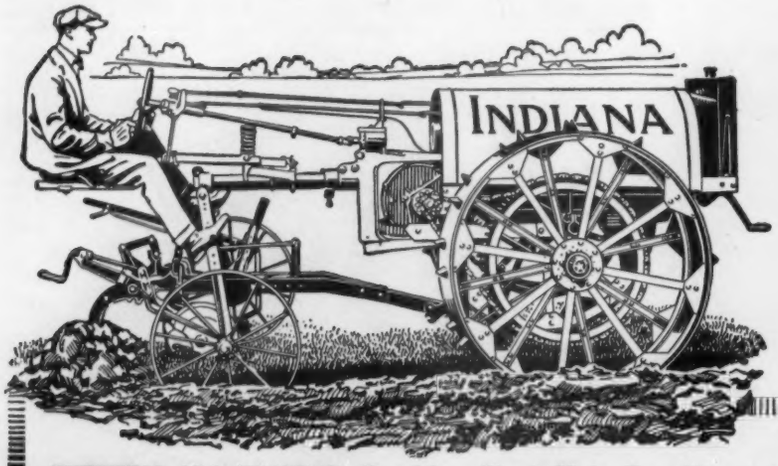
Guaranteed absolutely collision-proof and grease-proof, the Dreadnaught lives up to the quality of its name—Indestructible. And Dreadnaught Service insures the continuation of accuracy for all time. Endorsed by leading truck manufacturers. Reading always right side up.

AMERICAN TAXIMETER COMPANY

16 West 61st Street :: New York

Branch Offices and Service Stations:

BOSTON
584 Commonwealth Ave.
BUFFALO
52 Gill Place
CHICAGO
2728 Michigan Ave.
CLEVELAND
1834 East 13th Street
DALLAS
1323 Young Street
DETROIT
Monroe Ave. & Hastings St.
LOS ANGELES
114 W. Pico Street
PHILADELPHIA
1427 N. Bouvier Street
PITTSBURGH
200 So. Hiland Ave.
SAN FRANCISCO
1426 Bush Street
SEATTLE
800 East Pike Street
ST. LOUIS
4533 Delmar Ave.
WASHINGTON
1231 20th St., N.W.
NEW ORLEANS
947 Howard Ave.
MILWAUKEE
197 Ogden Ave.
PORTLAND, ORE.
2nd Street at Taylor



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"The World's Tractor"

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It really replaces horses—does as much work as four horses at a saving of at least $450 a year under horse costs. Saves also the wages of one man.

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The tractor for big and little farms. *Superior in every detail of construction. Low in price.* Address nearest office.

THE INDIANA SILO COMPANY

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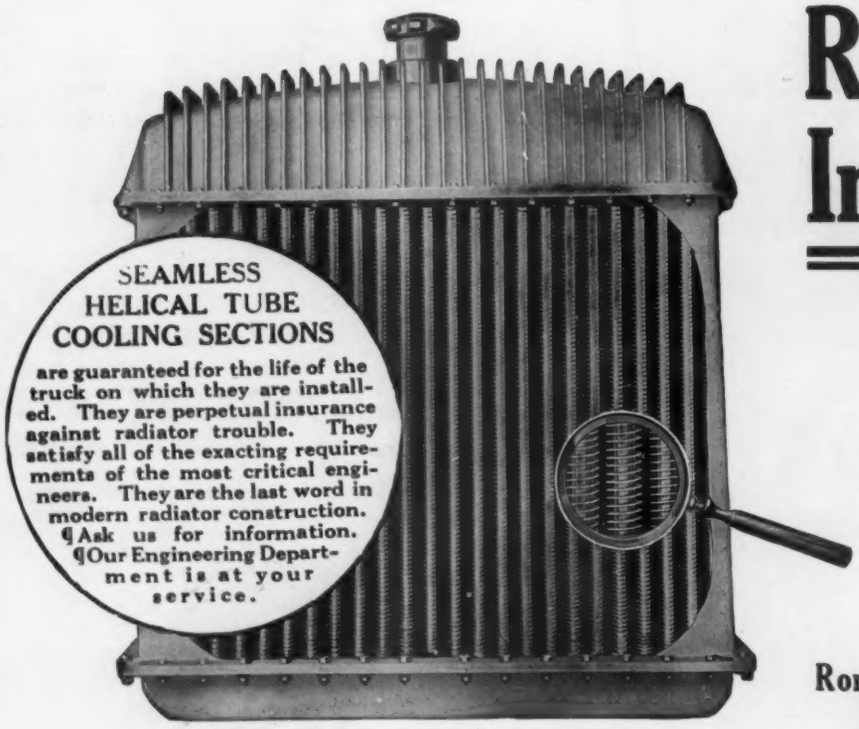
INDIANA SILO

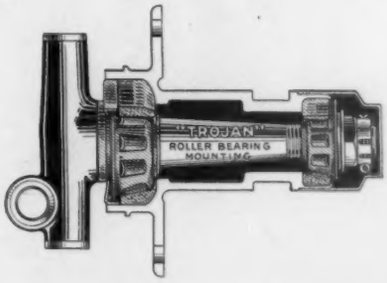
If there is no local agent for the Indiana Silo in your territory we want to place one there. Indiana Silo dealers make more money than dealers in any other Silo—because the country over they make more sales. For 15 years it has been the biggest selling Silo. Exclusive territorial rights may be secured. Write now for the facts.


SEAMLESS
HELICAL TUBE
COOLING SECTIONS
are guaranteed for the life of the truck on which they are installed. They are perpetual insurance against radiator trouble. They satisfy all of the exacting requirements of the most critical engineers. They are the last word in modern radiator construction.
¶Ask us for information.
¶Our Engineering Department is at your service.

Radiator Insurance

Sole Manufacturers

Rome-Turney Radiator Co.
Rome, N. Y., U. S. A.



TROJAN TAPERED ROLLER BEARINGS

For Ford and Chevrolet 490 Front Wheels

The **Trojan Roller Bearing** is an exact replacement of the cup and cone bearings now used in the front wheels of the Ford and Chevrolet 490 cars. No machine work necessary to install.

Thousands of these cars, **Trojan** equipped, are giving more service miles today than ever before.

You also can enjoy the easy steering, increased tire mileage and perfect safety by installing these bearings.

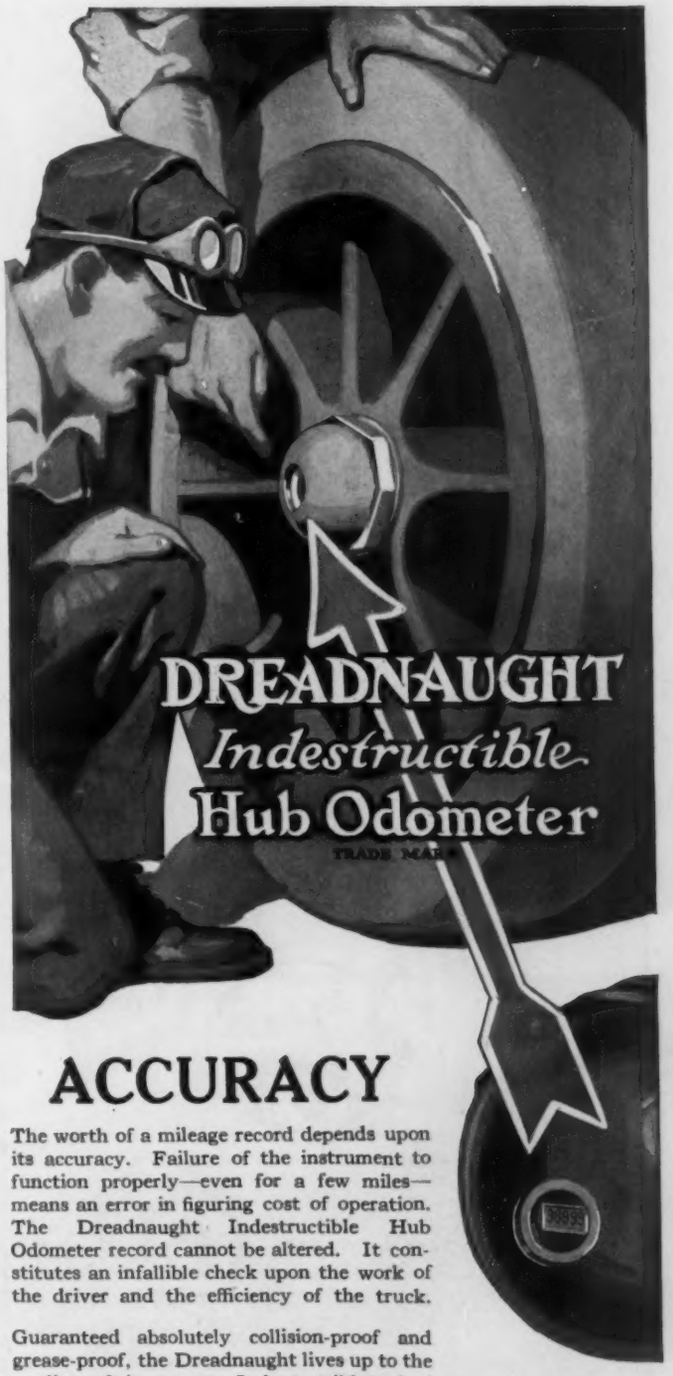
FIRST ON THE MARKET.

STILL IN THE LEAD.

AHLBERG BEARING CO.
2636 MICHIGAN AVE. CHICAGO, ILL.

	Branches:	
Atlanta	Los Angeles	Philadelphia
Boston	Minneapolis	Portland, Ore
Cleveland	New York	St. Louis
Detroit		San Francisco

Trojan TRADE MARK
ROLLER BEARINGS



ACCURACY

The worth of a mileage record depends upon its accuracy. Failure of the instrument to function properly—even for a few miles—means an error in figuring cost of operation. The Dreadnaught Indestructible Hub Odometer record cannot be altered. It constitutes an infallible check upon the work of the driver and the efficiency of the truck.

Guaranteed absolutely collision-proof and grease-proof, the Dreadnaught lives up to the quality of its name—Indestructible. And Dreadnaught Service insures the continuation of accuracy for all time. Endorsed by leading truck manufacturers. Reading always right side up.

AMERICAN TAXIMETER COMPANY

16 West 61st Street :: **New York**

Branch Offices and Service Stations:

BOSTON
584 Commonwealth Ave.
BUFFALO
52 Gill Place
CHICAGO
2728 Michigan Ave.
CLEVELAND
1834 East 13th Street
DALLAS
1323 Young Street
DETROIT
Monroe Ave. & Hastings St.
LOS ANGELES
114 W. Pico Street
PHILADELPHIA
1427 N. Bouvier Street
PITTSBURGH
200 So. Hiland Ave.
SAN FRANCISCO
1426 Bush Street
SEATTLE
800 East Pike Street
ST. LOUIS
4533 Delmar Ave.
WASHINGTON
1231 20th St., N.W.
NEW ORLEANS
947 Howard Ave.
MILWAUKEE
197 Ogden Ave.
PORTLAND, ORE.
2nd Street at Taylor

EMPRESS

THE RECOGNIZED STANDARD GREASE AND OIL-CUP EQUIPMENT FOR MOTOR-DRIVEN VEHICLES

ONE OF THE MOST IMPORTANT ESSENTIALS OF SUCCESSFUL OPERATION IS

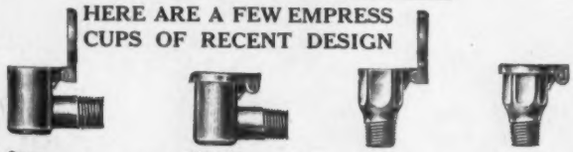
PERFECT LUBRICATION

This is Furnished to the Last Degree of Efficiency by

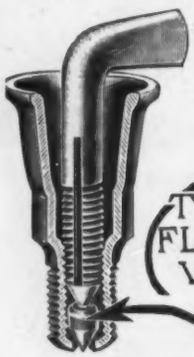
EMPRESS GREASE AND OIL CUPS

Empress Cups are carefully designed to lubricate perfectly every part needing lubrication. They are drawn from sheet metal, making them extremely strong and eliminating unnecessary weight. They are worthy of a place on your trucks.

HERE ARE A FEW EMPRESS CUPS OF RECENT DESIGN



Open — Elbow Type — Closed — Open — Straight Type — Closed



These hinge-lid oilers are not to be confused with the ordinary poorly constructed cups of this type. They are well made throughout, built to stand hard usage. Special attention is called to the hinge-construction, the weak point of most hinge-lid cups. In these cups the hinge is made extremely strong. Positively self-closing and dust proof. Write for prices.

THE FLOATING VALVE POINT

PATENT APPLIED FOR
Fig. No. 117

The Empress Priming and Relief Cup was designed to supply the demand for a low-priced, dependable cup. The floating brass valve point gives it a distinct advantage over any priming cup on the market. This point adjusts itself to all conditions and insures a positive seat when closed. Not affected by vibration. Write for full description and prices.

A few types of grease cups, well suited to truck work, especially in places of extreme vibration. No danger of losing the cap from one of these cups. Each is equipped with an effective locking device.

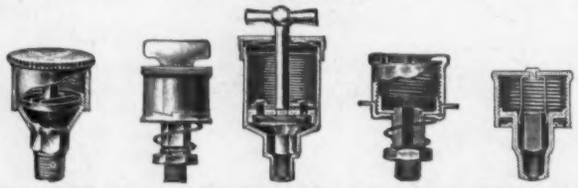


Fig. No. 249 Fig. No. 287 Fig. No. 214 Fig. No. 209 Fig. No. 229

Many other styles of grease and oil cups equally adaptable for truck work are shown in our catalog. If you haven't a copy

SEND FOR CATALOGUE "F" TODAY

BOWEN PRODUCTS CORP.

Auburn Division - - - Auburn, N. Y.
Winkley Division - - - Detroit, Mich.
Zerk Division - - - - Cleveland, Ohio
Stahl Division - - Minneapolis, Minn.

CANADIAN FACTORY:
CANADIAN WINKLEY CO., LTD., WINDSOR, ONT.

Standard From the Beginning of the Industry

Since the very beginning of the motor truck industry, Highland Bodies and Highland Cabs have been the standard of quality and value.

The best in materials and workmanship, backed by a thorough knowledge of the conditions under which they must be used, gives them a long life, even under the hardest service.

The completeness of their standardization and the wide distribution they have, makes it possible for us to supply them at a cost no higher than that of inferior jobs.

EVERY DAY
MOTOR TRUCK CAB

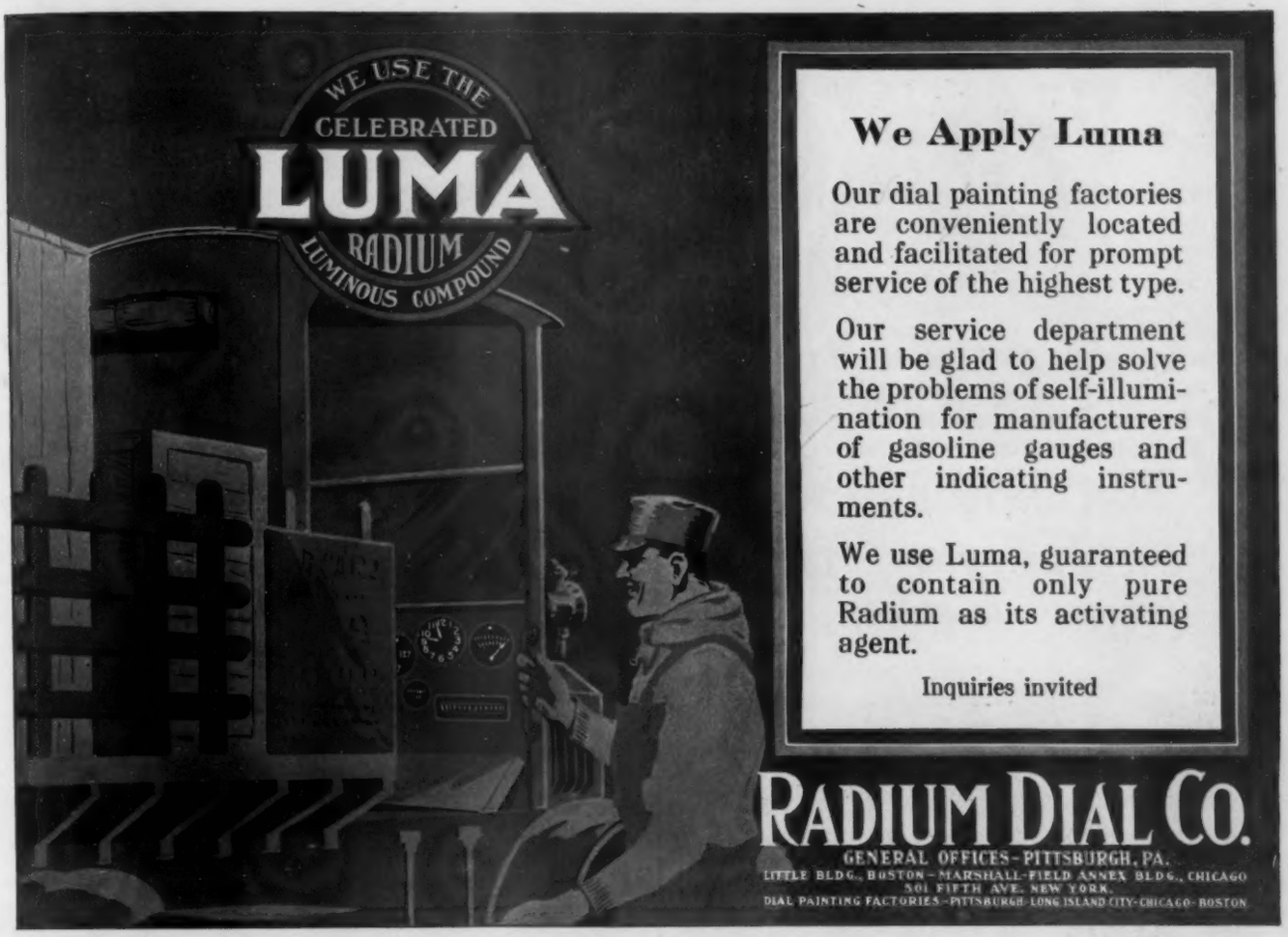
The "Every Day" Cab has the same quality features that have made Highland Bodies the standard of the business—the careful design and adaptability to the requirements of actual service.

It can be quickly adjusted to meet the changes of weather and season—fully enclosed for winter and open for summer.

Demand Highland Quality

You can get Highland Bodies and Cabs if you specify them. By doing so, you are sure of equipment that will greatly outwear the ordinary kind.

The Highland Body Manufacturing Co.
317 Elmwood Place Cincinnati, Ohio



We Apply Luma

Our dial painting factories are conveniently located and facilitated for prompt service of the highest type.

Our service department will be glad to help solve the problems of self-illumination for manufacturers of gasoline gauges and other indicating instruments.

We use Luma, guaranteed to contain only pure Radium as its activating agent.

Inquiries invited

RADIUM DIAL CO.

GENERAL OFFICES - PITTSBURGH, PA.
LITTLE BLDG., BOSTON - MARSHALL-FIELD ANNEX BLDG., CHICAGO
501 FIFTH AVE., NEW YORK.
DIAL PAINTING FACTORIES - PITTSBURGH - LONG ISLAND CITY - CHICAGO - BOSTON

COUNTERBALANCED

PARK

CRANKSHAFTS

Patented July 10, 1917

We have shipped 67,051 Counterbalanced Crankshafts up to February 24, 1919

THE PARK DROP FORGE COMPANY

CLEVELAND

You cannot look entirely to the truck builder—

for low fuel-consumption, low operating and low maintenance costs. Your truck may embody these economies in the features of its construction, but you have got to look to the

Veeder
HUB ODOMETER

for the big savings possible under careful, well-managed **operation.**

If the truck manufacturer has failed to provide your trucks with Hub Odometers, you'll be paid many times over for equipping at your **own** expense. Because **Veeders** will show your costs-per-mile in a way that shows up every **fuel** or **upkeep extravagance.**

The rugged Veeder mechanism always ADDS mileage, whether truck runs forward or backward. Regular Veeder model, $20. Special model for Ford trucks, $15. Ask to be fully informed.

The Veeder Mfg. Co.
10 Sargeant Street Hartford, Conn.

New York Distributor
Joseph T. Quinlan
1777 Broadway

Detroit Distributors
Geo. F. Balk Sales Co.
14 Alexandrine St., West

Chicago Distributors
C. G. Wirick Co.
617-619 Fulton St.

Pacific Coast Distributors to Jobbers and Dealers
F. Somers Peterson Co.
60 Pine St., San Francisco, Cal.

Pacific Coast Distributor to Automobile and Truck Mfrs.
Alfred H. Coates
444 Market St., San Francisco, Cal.

Middle West Service Station: C. G. Wirick Co., Chicago

Commerce TRUCKS

A Valuable Franchise

The value of exclusive sales rights for a product depends upon the terms of the contract — the stability and responsibility of the manufacturer — the reputation and dependability of the product and the established demand for it.

The terms of the Commerce franchise favor the dealer — are protective, as well as liberal. Back of this franchise is a company, financially sound, with whom it is a satisfaction to do business.

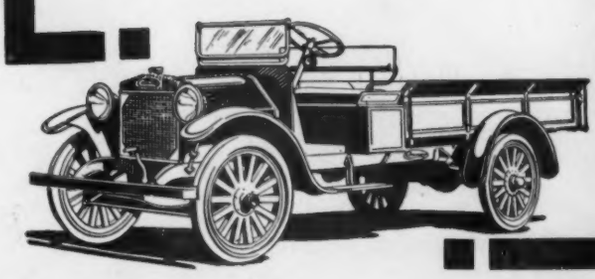
The reputation and dependability of the Commerce Truck carries the endorsement of every owner and the fact that Commerce Trucks are represented in every line of business testifies to the universal demand for them.

Full details of the exceptional features of the proposition we offer will interest you.

1 TON ½ Ton Overload Capacity Solid Tires **$1500**

1½ TON ½ Ton Overload Capacity 36 x 6 Pneumatic Cord Tires **$1895**

The Commerce Motor Car Co.
Manufacturers of Motor Trucks
Detroit, Mich.



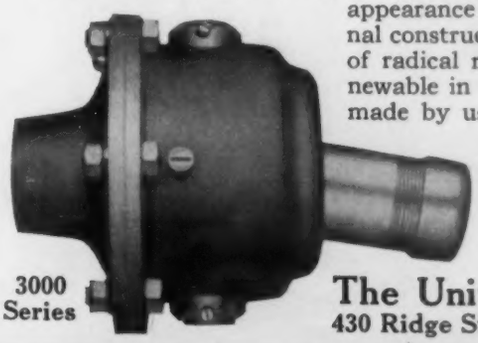
"STANDARD" UNIVERSAL JOINTS

Double assemblies—5-p-40, 5-p-75 and 5-p-90 are illustrated above. These cover all light and heavy-duty requirements, and are now largely specified by leading truck makers.

Our 5-p-40 was standard on 1½ ton Aviation trucks, and is scoring big success on all models (above ¾ ton trucks) turned out by the GMC. Two sizes larger handle up to the largest trucks.

The 2500 series joint is standard on the Government double "A" trucks. While similar in outward appearance to other joints, the internal construction exhibits many points of radical refinement. All parts renewable in case of wear. All joints made by us are dust-tight and self-contained with oil and grease chambers.

We can handle more business promptly. Write and give us your requirements.



3000 Series

2500 Series

The Universal Machine Co.
430 Ridge St. Bowling Green, Ohio

BOWSER ESTABLISHED 1885

Systems for Lubricating Oil

CURB PUMP

The Bowser curb pump for lubricating oils is coming into universal usage. Motorists look for it and the dealer so equipped gets the trade.

Figure 245 pump is a handsome, powerful lubricating oil pump. Day and night it sells lubricating oil. It pumps a half-gallon, quart or pint as desired. Equipped with lock.

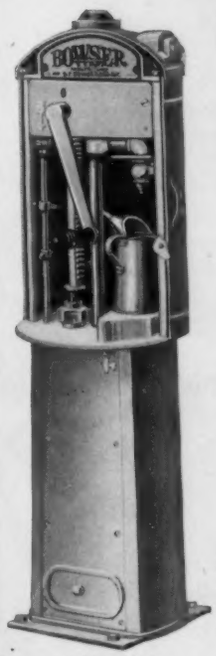


Figure 245

Figure 154 illustrates the Portable Lubricating Oil Outfit. Has tank capacity of 65 gallons. It measures quart, pint or half pint. Wheel it where the cars are, inside or out. A World Beater for Service.

Either of these outfits alongside your curb gasoline pump will increase your Lubricating Oil Sales.

Interesting booklet sent on request.

Portable Wheel Tank

Figure 154

THE S. F. BOWSER CO., Inc.
Ft. Wayne Indiana, U. S. A.

Canadian Office and Factory: Toronto, Ont.
London, 32 S. Victoria St. S.W. 1
Sydney, 6 Castlereagh St.
Paris, 5 Rue Denis-Poissons
Havana, Lonja del Comercio 427

Closed

Yoke Jaws For Bushings Eliminate All Chance of "Spreading"

LONGER SERVICE and greater strength are secured by the *closed* yoke jaws of ARVAC Universal Joints.

The chance of spreading—existing always when bushings are not completely enclosed by the jaw—is entirely eliminated.

The yoke bushings are machined with shoulders at the inner end and are pressed into the yoke jaws, making it impossible for them to work out of place.

Just another reason why you, as a maker of trucks or passenger cars, will increase the dependability of your product, perhaps without increased cost, by adopting ARVAC *quality* joints.

Arvac Manufacturing Company
ANDERSON, INDIANA

ARVAC
TRADE MARK

Universal Joints
and
Propeller Shaft Assemblies

Branch Offices:

CHICAGO
1507 Lytton Bldg.

CLEVELAND
521 Guardian Bldg.

DETROIT
2020 Dime Bank Bldg.

Quality

NEW DEPARTURE DOUBLE ROW TYPE.

¶ A highly successful two-purpose bearing—resisting radial and thrust loads from any direction and in any combination. A single, self-contained unit that does the work of three ball bearings, used in combination mounting.

Thus, a considerable saving is made in cost, installation expense, housing space, machining maintainance costs, etc. Non-adjustable and tamper-proof.

Chrome Alloy Steel
Service-Proven Design
Precise Workmanship
A Full Jeweled Bearing

The New Departure Manufacturing Company,
Bristol, Conn. 390 Detroit, Mich.

New Departure Ball Bearings

Multiple Disc Clutches

Our standard K-12 type represents the best in clutch construction. By its smoothness of engagement the full torque of the motor is delivered to the rear wheels so gradually that the heavy starting strains are relieved throughout the vehicle, with appreciable reduction in tire wear.

It is a self-contained unit, with a multiplicity of discs to give sufficient friction for the most extreme conditions, yet not excessive for normal lasting service.

Driven parts of maximum lightness, for ease in gear shifting; provided with brake.

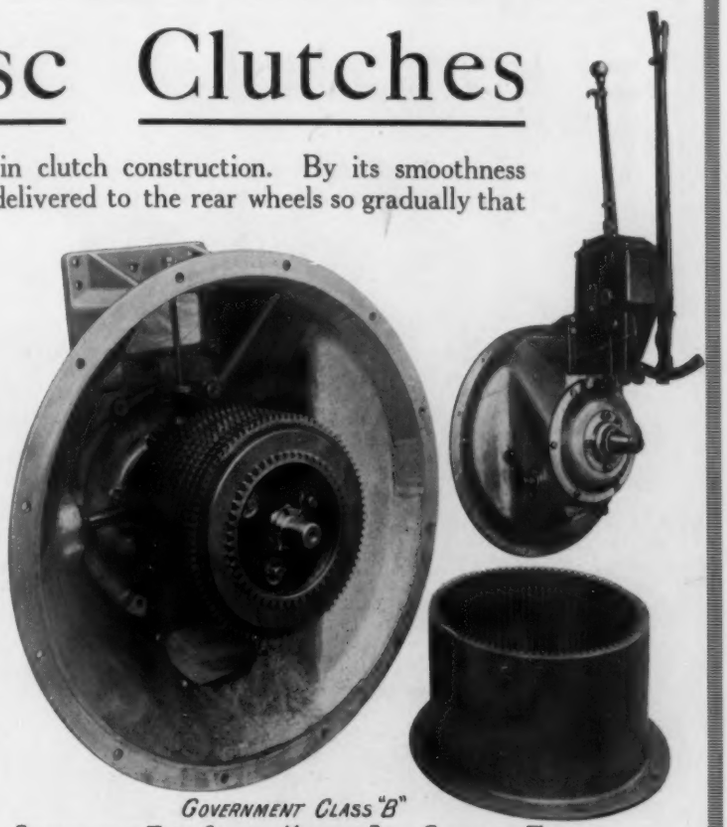
Its serrated disc edges eliminate wear and back lash.

The discs operate dry.

Tell us your requirements. We can supply what you need.

Warner Gear Company
MUNCIE, INDIANA
DETROIT OFFICE: 967 Woodward Avenue

We are privileged also to supply to American manufacturers the Government standardized Class "B" truck clutches and controls, here illustrated.



GOVERNMENT CLASS "B"
STANDARDIZED TRUCK CLUTCH—MULTIPLE DISC—SERRATED TEETH

Clark of Oshkosh
SERVICE QUALITY

All Season Cab

Efficiency: Maximum service from truck all seasons.

Economy: Standardized and manufactured in quantities.

Durability: Finest quality of materials used throughout. Designed and constructed to give years of service.

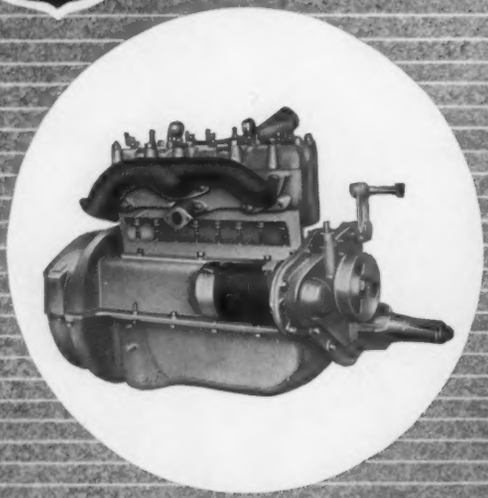
Comfort: Roomy, with LUXURY spring cushion and back.

Write for catalog of standard cabs and bodies to

J. L. Clark Mfg. Co.
Oshkosh, Wisconsin

Clark of Oshkosh SERVICE QUALITY "ALL SEASON" CAB

AGAIN AT YOUR SERVICE



As noted in previous advertising, the demands made upon us by our government during the war—demands which we gladly met and fulfilled—prevented us from taking on any commercial work.

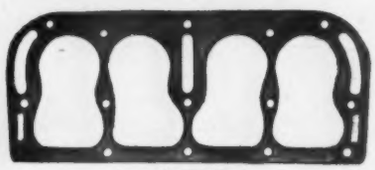
Now we are clearing the decks and will soon be in position to carry on your motor building to our full capacity. All of our old as well as new customers can be assured of the same high charactered motors for light trucks and tractors upon which we have built our high reputation in the trade. Perfect motors—promptly delivered.

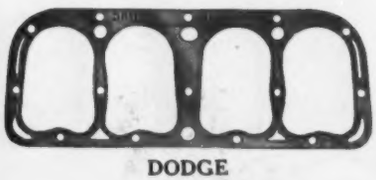
Lycoming Foundry & Machine Co.
Williamsport, Penna.

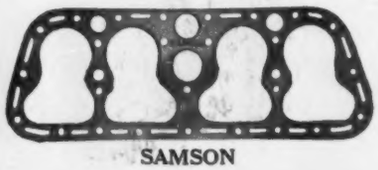
LYCOMING MOTORS

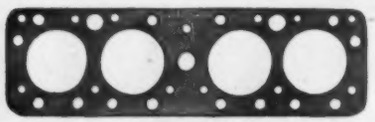
For 87 Types of Cylinder Heads

all carried in stock and ready to ship to you for your repair jobs


MAXWELL


DODGE


SAMSON


BUICK

There are Never-Leak Gaskets here for the big majority of requirements, and repairmen who carry them not only make the best engine set-ups, but also make more money because these gaskets cost less than others.

Truck service is growing heavier and harder each day. Repair jobs are coming faster. Do the best work and make the most money by stocking up on

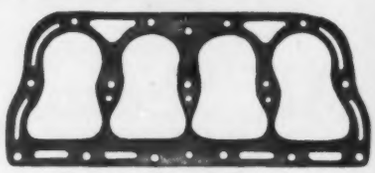
NEVER-LEAK GASKETS

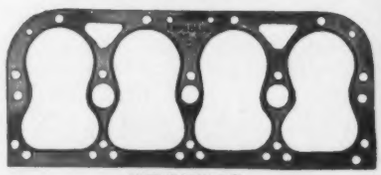
for trucks. Give the owners 100% pure service. They demand it, and they will stick to you when you render it.

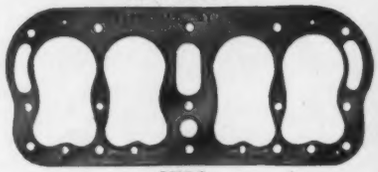
Order now—for the money and satisfaction there is in it.

We carry this big stock of truck gaskets (also a large line of passenger car gaskets) to give you quick service. If we don't have what you want, we'll make it, quickly.

The Fitzgerald Mfg. Co.
Torrington, Connecticut


OVERLAND


REPUBLIC


VIM

CHEVROLET

Williams' Superior Drop-Forgings

THE *typical* design of gas engine Connecting Rods does not require that the larger boss shall be split in the forging, as indicated by the above illustration of a rod we made in large quantities for the Liberty Motor. So much the better. While we are prepared to undertake this or other difficult forging problems, the cost of producing the simpler form of rod is, of course, considerably less. The point we wish to emphasize is, that the experience obtained during nearly half a century in the unceasing effort to make only the best—the *Superior*—qualifies us to care intelligently for the exacting requirements of drop-forgings used in commercial cars.

Our two complete plants at Brooklyn and Buffalo, N. Y., are at your command; inquiries for special forgings solicited.

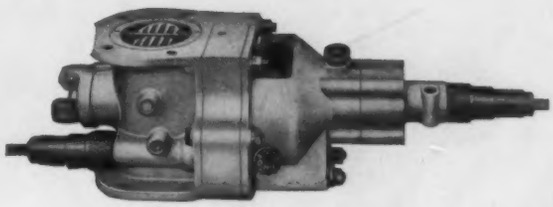
J. H. Williams & Co.

"The Drop-Forging People"

Plants:
Brooklyn and
Buffalo, N. Y.

General Offices:
80 Richards St.
Brooklyn, N. Y.

Cuts Gasoline Consumption 15 to 30 per cent. by Perfect Speed Control



LENGTHENS the life of your truck and increases its efficiency about 25 per cent. Costs more and worth far more than any other governing device.

Some Users

United States Army (Standard on Militor).

Nash, Gary, Winther, Garford, Republic, Duplex, Federal, Denby, Continental, Service, United, Buda, Wisconsin, Hercules, White, Schacht, Vim, Titan, Diamond T, Hurlburt.

Adams and American Express Company fleets and many other fleet operators and motor truck manufacturers.

DUPLEX and SIMPLEX

TRADE MARK — NONE OTHER

Highest Efficiency Governors for Truck and Tractor Service

The Duplex Engine-Governor Co., Inc.
Brooklyn, N. Y.

RADIATOR TUBING OF DURABILITY

Dominant on Battle Trucks and Aeroplanes

We number among our customers many of America's largest builders of tractors, trucks and automobiles.

Super-Cooling Efficiency

This Fin Tube type gives maximum cooling efficiency per cubic inch of core and per pound of metal used, as it combines free circulation of air with the greatest exposed radiating area.

The DALLAS Tubes are especially to be desired in truck and tractor radiator construction, on account of their *strength*. These tubes have no lap joints. They are either *double lock joints* or seamless, and will stand 100 pounds or more pressure. They give straight water circulation, which does not clog with alkali, dust or solder. Get the details.

Fin Tube Radiators

They offer *strength* in the seamless, or double-locked 32 gauge (or heavier) metal, with few joints to loosen through vibration, and *efficiency* through *straight free circulation*.

Dallas Brass & Copper Company

223 North Jefferson Street Chicago, Ill.

FINAL Cost is the Important Thing

This Organization not only makes perfect die castings from specifications, but will work in close harmony with your Engineering Department—co-ordinating our knowledge and experience in the art of die casting with your thorough appreciation of your manufacturing requirements. Use the Precision Organization as a regular department of your plant, the same as your machine shop, forge shop, etc. Let us show you.

PRECISION CASTINGS COMPANY, INC.
SYRACUSE, PRECISION CAST NEW YORK.

Die Casting Plant Syracuse, N. Y.

Brass, Bronze and Aluminum Foundry Pontiac, Mich.

KEEP THE ENGINE COOL!

No Engine Can be More Efficient Than Its Cooling System

Each Long Cooling System is especially designed for the motor with which it is to be used. Each step in creating the design is taken in co-operation between the Engineering department of our factory with those of the manufacturer. The result is the highest possible efficiency at lowest cost.

Long Cooling Systems are specified by the leading engineers of the automotive industries.

LONG MANUFACTURING CO. **Detroit, Mich.**

Pioneer Makers of Cooling Systems for Gasoline Engines

AS CONSTANT AS NIAGARA

Long Spiral Tubing is the most efficient, durable and dependable for Motor Trucks and Tractors — annual capacity thirty million feet.

LONG COOLING SYSTEMS

The Recognized Standard for Tractors, Trucks and Motor Cars.

WOLVERINE 1½ Ton TRUCKS

This sturdy, dependable 1½ ton truck is built from tires to top on a basis of service-giving that carries conviction to the mind of every truck-wise buyer who sees it.

As an earnest of the high caliber of the whole car, we note above, a few of the principal parts. Comment on their standing in the truck industry is unnecessary. *Wolverine buyers get the same quality in every part and in every detail of construction.*

Points of Selling Punch

A reliable Continental motor supplies maximum power at minimum cost. The Wolverine is equipped with a starting and lighting system. Other features of construction are a Special Cast Shell Radiator; Russel Internal-Gear Drive Axle; heavy drop-forged front axle, equipped with Timken bearings; irreversible worm and gear Steering Gear; a heavy 5" channel section frame and heavy-duty artillery type wheels. Wheelbase, 140".

Truck Demand Exceeds Supply

Dealers—Don't lose sight of this fact. Trucks in the Wolverine class are being "snapped up" as fast as they can be promised. *We can ship promptly.* No waiting—no irritating delays. Your customers get delivery service on the dot, but—

We can take care of only a few more dealers and still make good on deliveries. Write or wire—*Now.*

The American Commercial Car Co.

Gratiot Ave. and Detroit Terminal Railroad, Detroit, Michigan

HOODS • FENDERS • TANKS

SHEET METAL PARTS

In selecting sheet metal parts, quality is most important as a deciding factor. Too often this is overlooked by designers who take it for granted that all sheet metal parts are alike. They are not.

York products excel in material selection, fit, enameling and appearance. Automobiles, trucks and tractors so equipped show outwardly a

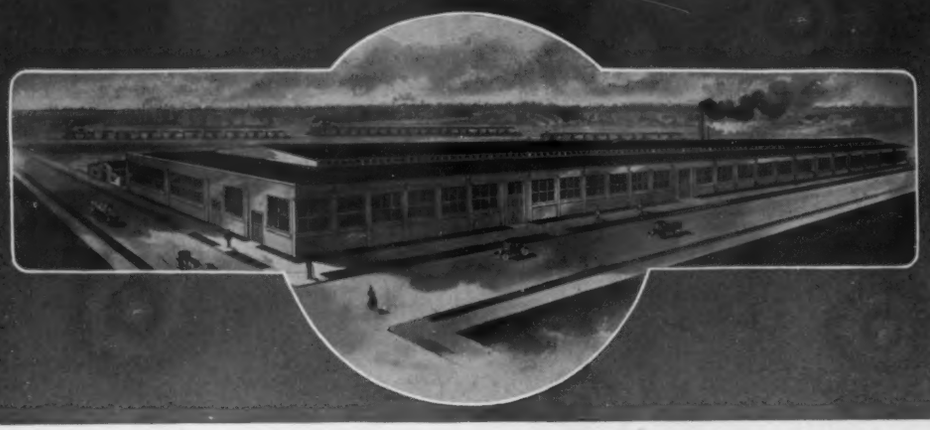
HIGH STANDARD of QUALITY

York tanks are essentially strong and durable. They are built to endure the rough usage imposed by trucks and tractors. As a quality part they guarantee practical immunity against leakage.

We specialize on Hoods, Fenders, and Tanks, but our facilities are ample for the turning out of sheet metal parts of any description, over your specifications.

Let us quote you

York Corrugating Co.
York, Pa.



Hoods Fenders Tanks Stampings
Sod Pans—For Trucks and Tractors
We Furnish Heavy Gauge, Acetylene Welded Tanks for Trucks
Ford Crown Fenders

Send Your Blue Prints for Quotations

Motors Metal Manufacturing Company
Detroit, Michigan

When You Specify

Packard CABLE

you are guaranteeing trouble-proof Cable for lighting, starting and ignition

Write for samples

DISTRICT OFFICES:

Atlanta, Ga.	701 Healey Building	John E. Colley, Manager
Chicago, Ill.	19 S. Wells Street	Fred B. Duncan, Manager
Dallas, Texas	1215 Great Southern Life Building	Fred McGraw, Manager
Detroit, Mich.	David Whitney Building	W. L. Marsh, Manager
Kansas City, Mo.	419 Rialto Building	E. S. Davis, Manager
San Francisco, Cal.	149 New Montgomery Street	Paul Gardiner, Manager
Seattle, Wash.	L. C. Smith Building	R. E. Voorhees, Manager

MEMBER OF ... NEW YORK, U.S.A.

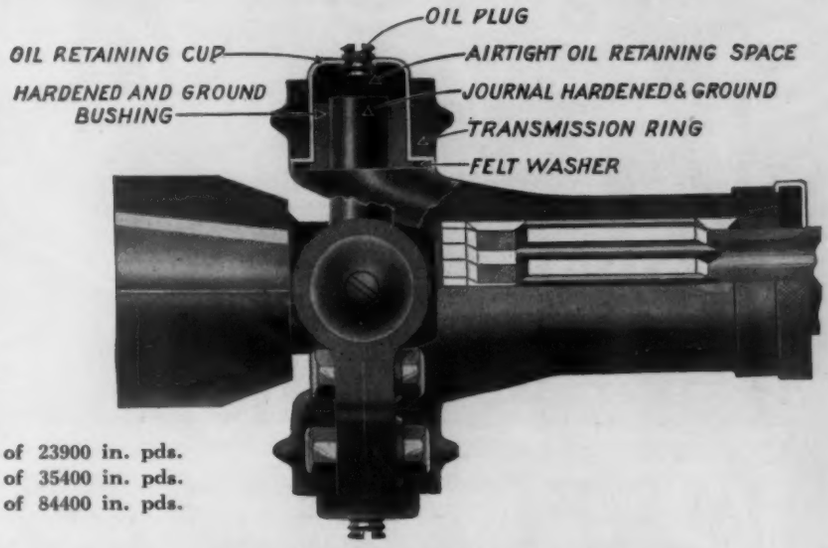
The Packard Electric Company

WARREN, OHIO

A Remarkable Breakdown Test

As an evidence of the tremendous strength built into Acme Universal Oiltite Joints, we submit to truck engineers, and others interested, the results of torque tests made at the University of Michigan, by Professor J. A. Van Den Broeck. These tests were continued to the point of failure:

No. 4000 stood a torque strain of 23900 in. pds.
No. 4500 stood a torque strain of 35400 in. pds.
No. 5000 stood a torque strain of 84400 in. pds.



Acme Universal Oiltite Joint

The joints referred to here range from 30 to 75 h.p. They are all creations of correct design, simple construction and liberal oversizing. A distinctive feature of design makes it necessary to lubricate the joint only very occasionally.

Our manufacturing facilities enable us to make prompt deliveries on all quantity orders. Engineers will find us ready to go into their problems covering this most important part.

Acme Universal Joint Mfg. Co.
Kalamazoo, Mich.

TRIANGLE TRUCKS

As an automotive dealer who is in touch with the constantly growing demand for motor trucks in every line of essential business, you must know the importance that attaches to **immediate deliveries** of **good trucks.** Triangle Trucks of 1½ and 2 ton capacities cover the field of biggest demand—the field in which sales are quicker and more numerous. This particular field is doubling itself every year.

You will find it easier to sell Triangle Trucks, because of the impression created by such names as Waukesha, Eisemann, Stromberg, Celfor, Fuller, Universal, Hyatt, Bower, SKF, Perfex, M. & S., Torbensen, Gemmer and Banker.

1½ and 2 Ton Models

Dealers, write

Triangle Motor Truck Co.
St. Johns, Mich.

Eastern Representatives:
TRIANGLE MOTOR SALES CO.
381 Fourth Avenue, New York City

New England Distributors:
EUGENE F. LALLY & SONS CO.
Boston, Mass.

One of the biggest points in your favor that we know of is that every single unit of the Triangle is a vital selling point, thus giving the finished assembly an unlimited wealth of talking points. Wire or write for our complete dealer proposition.

TRIANGLE Truck equipped with standard body, cab and Banker ventilating windshield

Hartford

Universal Joints

Cone Clutches

The Factory—more than doubled in size and capacity. The skilled workmen in correspondingly increased numbers. The engineering staff larger than ever. *Result: Production traveling abreast of heavy orders. Deliveries prompt as always.*

The Products—Same carefully selected materials. Same Hartford correct design. Same careful turning out of finished products from raw steel to tested perfection.

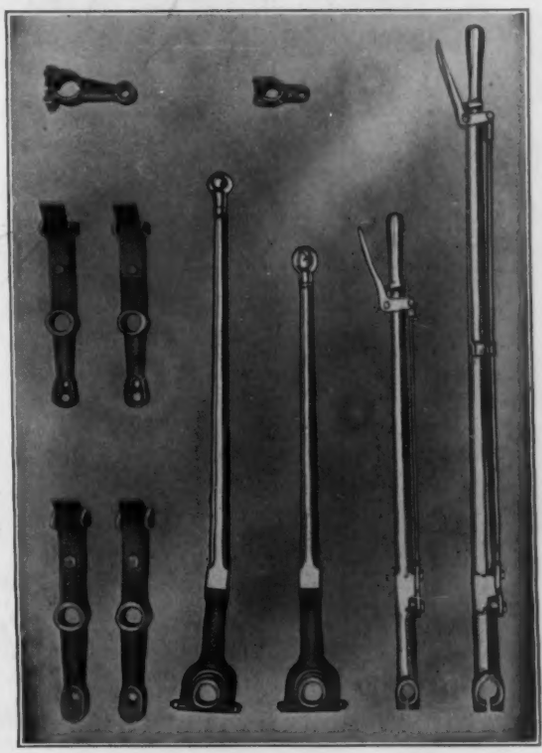
"Hartford Cone Clutches and Universal Joints for big and little trucks." Write our engineering department. We co-operate.

Hartford Auto Parts Company
Hartford, Conn.

BATAVIA Control Sets

Drop-Forged Levers. Best workmanship. Assembled in many types of Base Castings. Suitable for 1 to 5 Ton Trucks.

Write for blue-print New 4-Speed Control.



Baker Gun and Forging Co.
Batavia N. Y., U.S.A.

Detroit Office: F. C. LONNEY, Washington Arcade

Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

Thousands in Use

SIZES
Four Wheel Trailers
1,250 lbs.
1,500 lbs.
2,000 lbs.
3,000 lbs.
4,000 lbs.
7,000 lbs.
10,000 lbs.
Semi-trailers
3,000 lbs. 6,000 lbs.
10,000 lbs.

Bodies for every business

Good Profit—Small Expense—Quick Turnover

MARGIN minus expense multiplied by turnover is the formula that states the dealer's profit. Apply it to the Trailmobile and the big possibilities for making money are as plain as day.

The profit margin is about the same as that on the most sought for trucks.

Expense of handling is less than on any line our dealers have ever sold.

Turnover under the arrangement we offer ranges from 12 to 20 times a year for energetic and able dealers.

And the Trailmobile makes friends, builds good-will and increases the volume done every year.

Find out what present Trailmobile dealers are doing. Write now for the facts.

The Trailmobile Co.
502-522 E. Fifth St.
Cincinnati, O.

Contractors to the U. S. Government.

Good roads are preserved by reducing the load carried on each wheel.

The patented Prest-O-Grip Lock Links

Easy to snap on or off. Never Rust. Your hands are the only tools necessary

Prest-O-Grip

Anti-Skid Chains for Solid Tires

Are Easy to Snap On and Off

They Give Safe, Sure, Positive Traction

NO matter how cold the weather or how bad or how sudden the storm, the driver pulls the short chains, with lock links attached, out of the tool box and fastens them to the clamps on the spokes. There are no long pieces of chains to unravel in the cold, snow or rain. The whole thing is done in a few minutes without tools. The chains are attached wherever the truck happens to be—whether in the garage or on the road; whether on a smooth pavement or in deep snow or mud. The driver never has to push his truck around when attaching Prest-O-Grips.

When the need for the chains ceases, they are quickly detached—chains, with lock links attached, are thrown into the tool box. The equipment works instantly when needed; it immediately ceases to work when the need has passed.

Prest-O-Grip equipment for disc wheels

Our No. 26 Clamp is standard equipment for attaching Prest-O-Grips to all disc wheels, except those used on Packard trucks—for which we furnish a special clamp, No 20.

For trucks that do not have the necessary clearance between brake drum or brake mechanism and felloe to permit the use of the regular spoke clamp—

We furnish our No. 33 Clamp, which is attached to the felloe of the wheel instead of the spoke. This clamp will fit any wheel using pressed-on tires, with felloes 4¼ in. or wider and 2¼ in. or thicker.

NEW PREST-O-GRIP BOOKLET AND TRUCK DATA SHEET

We issue an attractive booklet fully describing all of the Prest-O-Grip features. Every automotive engineer, truck owner, jobber and dealer should have a copy—also a copy of our No. 5 truck data sheet, listing price and details of equipment for all leading makes of trucks. No need to measure spokes or rims. Every truck listed by make and tonnage.

MEMBER OF

The Rowe Calk & Chain Company

Plantsville, Conn.

"That's why the Cleaning Room is always ahead of the work".....

"The OAKITE in that tank does it.

"The day the Oakite man got in here, we were cleaning steel automobile bumpers, which were covered with emery and oil. We were about 300 behind and were only turning out about five or six an hour, because we had to brush them.

"The Oakite man made up three tanks with Oakite, and we caught up on our back work in ***one day***—eliminated brushing—and we have never been a single piece behind since."

OAKITE

MANUFACTURED BY

OAKLEY CHEMICAL CO.

38 THAMES STREET · NEW YORK

DU PONT AMERICAN INDUSTRIES

OUR NEW TOP MATERIALS
PONTOP AND LUXAR

We offer the trade two new rubber-coated top materials both of higher grade than we have ever been able to produce heretofore.

PONTOP AND LUXAR

PONTOP, our first grade, is absolutely the highest quality rubber-surfaced top material that we can produce. It stands every test better than any similar material we have ever made. It can be depended on to give complete protection and to wear perfectly.

LUXAR, of lower price than Pontop, is of such high grade that we consider it the best value of any top material on the market for all work where a dependable, stylish and guaranteed fabric is needed at a moderate cost.

PONTOP and LUXAR are made in 50 yard rolls, 54 inches in width. We supply either quality in both single and double texture and with white, black, drab, real whipcord or cord (imitation whipcord) back. We supply curtain materials to match.

Write for samples

DU PONT FABRIKOID COMPANY

Wilmington, Delaware **Toronto, Canada**

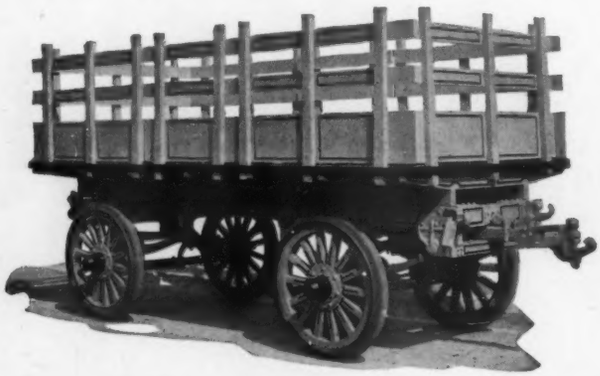
DU PONT

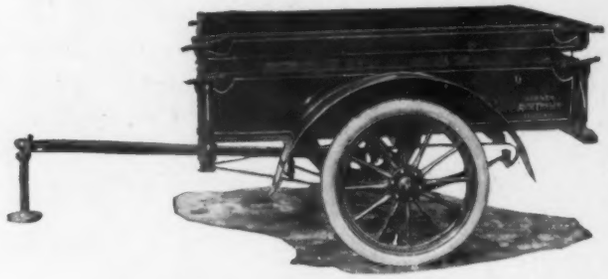
Specialized

Besides their general sturdiness and their practicability of design, ***Warner Trailers*** have been specialized to meet every particular hauling problem.

Their exclusive betterments have been adopted after careful experiments, and the tests of every-day business showed that they were practical and essential to the high degree of efficiency Warner engineers aimed to achieve.

There is a ***Warner Trailer*** doing your kind of hauling somewhere.





WARNER

HEAVY DUTY

TRUCK TRAILERS

TWO AND FOUR WHEEL TYPES

They are made in various sizes as well as models, matching the capacity of the motor truck that pulls them—and doubling its hauling capacity.

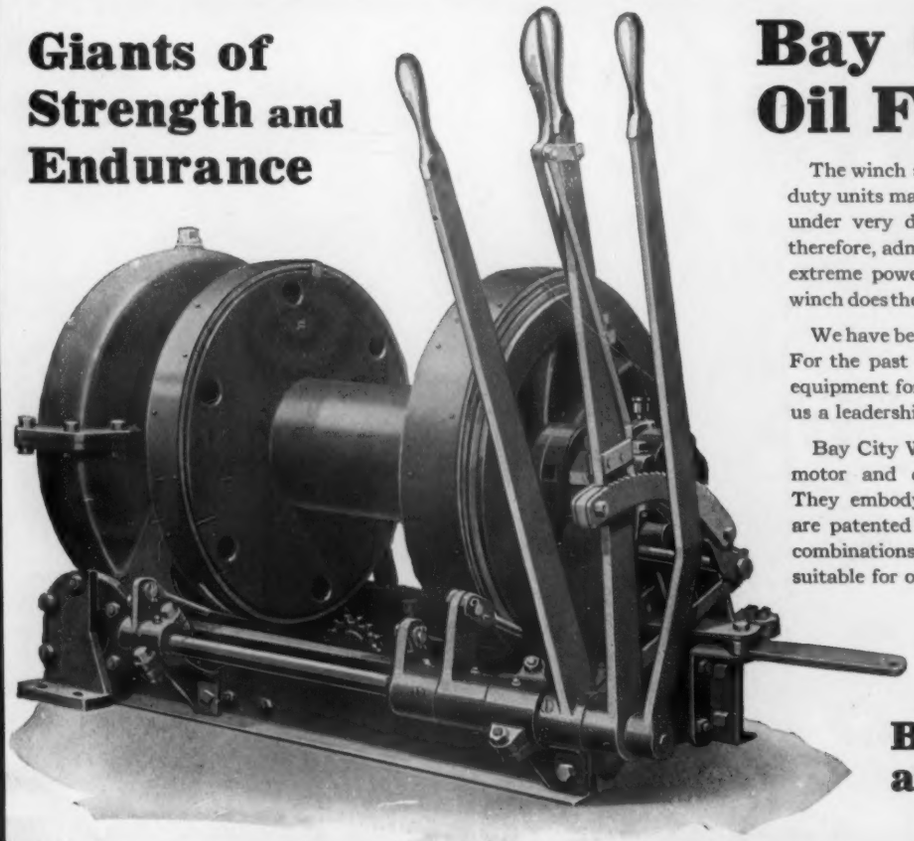
Their first cost is much less than that of a truck—their upkeep is negligible—and the expense of operation is practically nothing.

Warner Trailers are backed by a pledge of satisfaction—making them a valuable line for the dealer who knows that satisfied customers mean increased business.

Write for information

Warner Manufacturing Co.
154 Bushnell Ave. Beloit, Wis.

Giants of Strength and Endurance



Bay City Type C. O. Oil Field Winch

The winch shown here is typical of the heavy-duty units made by us. It is designed to operate under very difficult oil-field conditions and is, therefore, admirably adapted to many uses where extreme power and flexibility are needed. This winch does the work of four teams and several men.

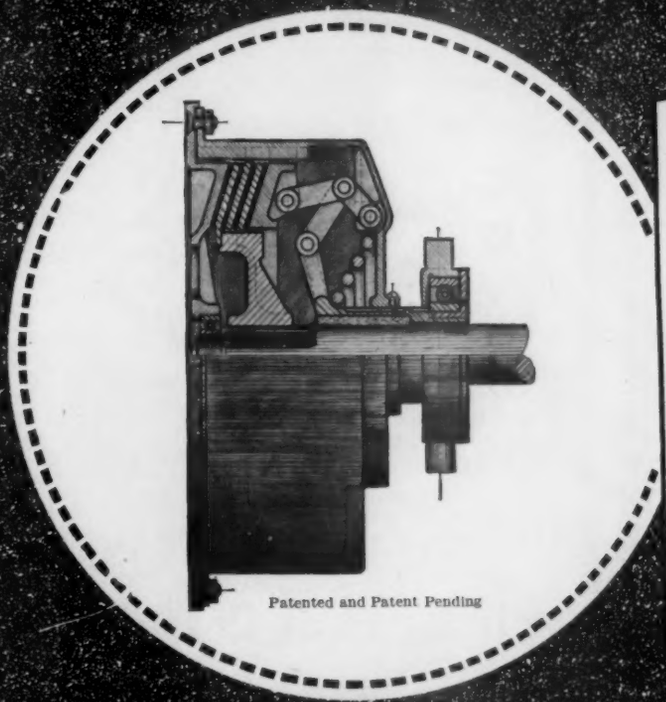
We have been building winches for fifteen years. For the past two years we have been designing equipment for trucks, and our success has given us a leadership in this field.

Bay City Winches are operated by the truck motor and controlled from the driver's seat. They embody several exclusive features which are patented by us. They can be used in many combinations, as they consist of several types suitable for ordinary service.

We will send upon request, complete illustrated description of our line of winches and cranes. Write for it.

Bay City Foundry and Machine Co.
Bay City, Michigan

M & E Dry Disc Clutches



Patented and Patent Pending

The latest refinement in clutch practice, designed and manufactured by the makers of the famous "Hele-Shaw" multiple disc clutch used by the government on all heavy F. W. D. trucks and tractors.

The M. & E. new type shown here is designed to meet all S. A. E. dimensions and is a model of strength, simplicity and lightness. The pins and links are case-hardened, thus minimizing wear. The friction surfaces of steel, fibre and cast-iron insure the greatest efficiency. Both

Single and Multiple Disc

types are at your disposal in two sizes up to 30 h.p. and 50 h.p. —made either self-contained or flywheel unit power-plant type—at your option. *Note that this clutch is absolutely dust-proof.*

Truck designers will find in these clutches a perfect solution to all clutch problems. Let us assist you.

Evans Alignment Joints are compact, durable and powerful. Total movement 8 degrees. Dust-proof and grease-tight.

Important—Mark your inquiry for Dept. 4

MERCHANT & EVANS Co

NEW YORK PHILADELPHIA WHEELING
BALTIMORE CHICAGO
ATLANTA ST. LOUIS
CLEVELAND KANSAS CITY

RECORDS— AGE— EXPERIENCE

Above are the three Independent Truck qualifications that unite to lessen selling resistance in a marked degree. Keen competition is fast putting the truck business on a basis which is eliminating unknown products of doubtful origin and with no age to prove their worth.

INDEPENDENT TRUCKS

have qualified. They have stood every hard test of service for over nine years. Our dealers can show the records of past performance—and sell on them.

And now consider the specifications from the standpoint of the buyer. They are incorporated in Independent Trucks.

Parts of Prestige

Motor, Continental; Transmission, Fuller; Clutch, Fuller; Carburetor, Stromberg; Rear Axle, Russel; Ignition, Bosch D.U. 4; Universal, Blood; Springs, Garden City; Tires, Firestone, 34 x 6, Rear, 34 x 4, Front.

There is selling punch in every specification. Add these to Records, Age and Experience. The result is a truck that sells on merit, regardless of price.

Write for our liberal sales plan. We will make your dealership well worth while

Independent Motor Truck Co., Inc. **Davenport, Iowa**

POWER

NORTH AMERICAN ENGINES FOR PASSENGER CARS TRUCKS AND TRACTORS

POTTSTOWN-PA

WILLIAM KRAFVE

Designer CAPITOL MOTOR TRUCKS

Pres. and Gen'l Mgr. CAPITOL MOTORS CORP.

Is a veteran in all branches of the automobile industry and whose 21 years of experience has resulted in the building of a line of Motor Trucks that will stand up with hard usage, carry tonnage at the lowest cost, last longest, are most accessible and simple in construction, and easy on the driver.

REMEMBER

The CAPITOL LINE 1, 2, 3½ and 5 ton trucks are the result of 21 years' practical experience.

CAPITOL MOTORS CORPORATION

FALL RIVER MASSACHUSETTS

DURSTON

TRANS-MISSIONS

"Gears of Lasting Fame"

The designing of transmissions is an art that requires expert knowledge and long experience.

The building of transmissions calls for the best of materials and the most careful workmanship procurable.

DURSTON Transmissions fulfil every requirement — they have stood the supreme test of hard service for many years.

Our Engineering Department is at your disposal for the kind of co-operation you want.

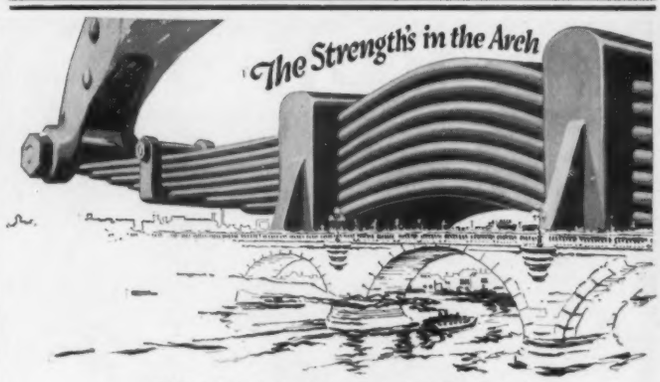
DURSTON GEAR CORP.

29 Maltbie Street

Syracuse

N. Y.

Write for data on our new Unit Power Plant Transmission for 1½ and 2 ton trucks.



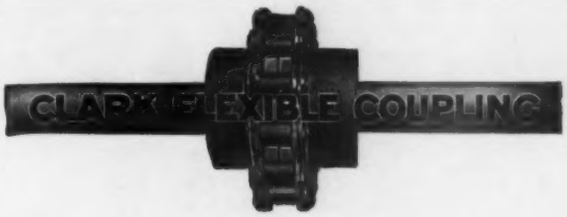
BUILT like a Bridge to Stand all Shocks—Tuthill Titanics are the unbreakable spring for every truck.

GUARANTEED TUTHILL TITANIC REGISTERED TRADE MARK SPRINGS LUBRICATED

Each shock is carried evenly the entire length of the spring. Center jolts or blows meet an unbreakable center. LET OUR ENGINEERING DEPARTMENT GIVE YOU COMPLETE DATA—Tuthill distributors everywhere. Complete list of distributors in "Chilton's" and "Auto Trade Directory."

Tuthill Spring Co., 760 Polk St., Chicago, Ill.

Established 1880



Increase the Performance Economy of Your Car, Truck or Tractor

There are one or more points in your vehicle where you can do it with one of our various types of

DEXTER or CLARK Flexible Couplings

We are "Flexible Coupling Headquarters"—the only firm that has developed a different type of Flexible Coupling for each different need.

Every coupling sold on a definite performance guarantee.

No orders welcome unless we can fill them to your *overwhelming* satisfaction.

Our Consulting Engineering Department is at your service without charge.

Get in touch with us today. It will pay you.

I. H. DEXTER CO., Inc.
Flexible Couplings
28 WALKER STREET NEW YORK CITY
Darling Bros., Ltd., Montreal, Quebec, Canada

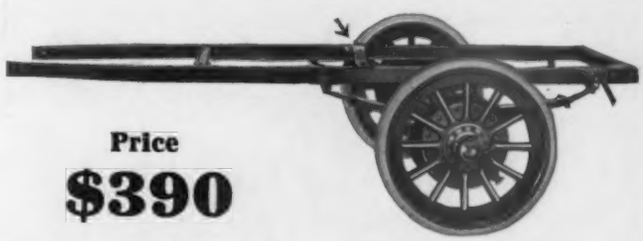
WANTED

Someone, or a selling organization, thoroughly familiar with the distribution of motor trucks to distribute or handle the sales of a motor truck company manufacturing a three-quarter ton, one ton, and a one and one-half ton motor truck, in any part or all of the United States.

We will make an attractive proposition to any one who can get results.

Address all replies to

"MOTOR TRUCKS"
c/o Commercial Car Journal
Philadelphia



Price
$390

Built in Our Own Factory Not an Assembled Product

Assuring you of prompt deliveries of these high-grade attachments or required parts—a big item to consider.

Jewett One-Ton Attachment
For Fords

Shaft driven with internal-gear axle—the accepted drive.

This is the strongest, most dependable and readily sold truck attachment ever put before the public.

DEALERS, WRITE OR WIRE

The Jewett Truck Attachment Co.
Newark, Ohio

"Standard" Tractor Axles

Owing to the many demands made upon us for a Worm-Drive Tractor Axle similar to the "Standard" Worm-Drive Truck Axle, we are starting production on a complete axle unit suitable for tractors of two and three-plow capacity.

We can furnish blueprints and assembly layouts to tractor manufacturers who are interested in buying a standardized rear axle unit, giving the necessary gear reduction so that it can be used in connection with a standardized transmission.

"Standard Worm-Drive Truck Axles made in capacity from 1 ton up"

Chicago Standard Axle Co.
1801 Belmont Ave. Chicago, Ill.

LeRoi Engines

STANDARD on a number of light truck, tractor and power cultivator outputs. Recognized and used on past and present records of excellence.

The LeRoi engine will carry its share of long life, faultless performance and economy. If similar quality marks all other parts, then the product so equipped is a model of promise and performance.

Model "2C", with bore of 3⅛" and stroke 4½" is giving splendid service and complete satisfaction wherever used.

Our manufacturing facilities enable us to make reasonably prompt deliveries.

Write at once for complete information

LE ROI COMPANY

Milwaukee, Wisconsin

TOWER
Motor Trucks

are built to give uninterrupted performance and service at an uncommonly low ton-mile cost.

Tower Motor Truck Co.
Greenville, Michigan

BURKE AUTOMOBILE PRODUCTS

The BURKE OX-ILIATOR

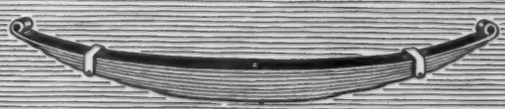
The Burke Ox-Iliator

The Burke Ox-Iliator, a new and highly efficient air moistener, applies in a new way the old principle of adding oxygen to fuel to secure combustion; gives snap and vigor to the explosive action; increases motor power; consumes carbon; reduces consumption of fuel. Inexpensive; easy to install.

Oxy-Genii capsules double the efficiency of any type of air-moistener, surcharging the water through which the air passes with *free* oxygen in its most volatile form. Package of 30 capsules—3 months' supply—price 75 cents. Write for booklets.

Automobile Devices Company
Philadelphia, U. S. A.

IRON CITY SPRINGS
Built to stand hard truck service



Iron City Springs have made good in the truck world because they are built to more than meet the requirements of hard truck service.

Pyrometrically controlled heat treatment and thorough testing at every stage make assurance doubly sure that Iron City Springs will give complete satisfaction.

Let us quote upon your requirements.

Quality and deliveries guaranteed.

Iron City Spring Company

Pittsburgh

Factory Representatives
Wetzel-Hall Company
New York City Detroit, Mich.

Penna.

CRAMP
BUSHINGS

Truck, car and aeroplane builders who aim to build faultless service and long life into their product, take no chances; they use CRAMP BUSHINGS, made of the famous Cramp Special Bearing Bronze.

Cramp Bushings have highest compressive strength and real anti-friction qualities. We are prepared to furnish bushings machined complete, ready for installation, or the ingots and rough castings, as you may desire.

Endow your product with the Cramp reputation by specifying Cramp Special Bearing Bronzes. Bushings, of all things, should be of proven quality. Write us about it.

Wm. Cramp & Sons Ship and Engine Building Company
Philadelphia, U. S. A.

ONEIDA

A combination of exclusive features, completely proved units of national reputation, and a variety of capacities calculated to meet the requirements of all classes of buyers.

Trucks of long life, tremendous strength plus reserve power and simplicity of construction. Prompt deliveries.

And there you have the Oneida Truck formula.

Dealers: If your territory is still open, *here is your opportunity.* Write or wire.

1, 1½, 2, 3½ and 5 ton models. All worm drive.

Oneida Motor Truck Company
Factories: Green Bay, Wisconsin

TRUCKS

Greater Motor Power
is only one of the features of the

Allen Differential

A radically different differential mechanism. A truly remarkable arrangement of the pawl and internal ratchet, positively controlled. Possesses wonderful superiority over ordinary differentials of all types.

Saves gas, tires.
Eliminates friction, strain, skidding.
Gives a positive two-wheel drive.
Distributes pulling power equally to both wheels.
Is not dependent upon traction on both wheels.
Self-locking, gearless.

Equally efficient on trucks, tractors and pleasure cars. Possesses features which will be demanded by all motor vehicle users. Don't overlook its great value as a selling point. Write now for full information.

The East Iron and Machine Company
Lima, Ohio, U. S. A.

MOSSBERG
ALL STEEL WRENCHES AND TOOLS

100% Operating Efficiency

for your trucks depends upon having repair equipment 100% adaptable and dependable. Quick and accurate repairing insures steady running time.

Mossberg Socket Wrench Set No. 19

has been especially designed to handle motor truck and general assembly work most economically. It includes an assortment of sizes to fit every need.

Write for descriptive catalog 201-G and prices on complete Mossberg line

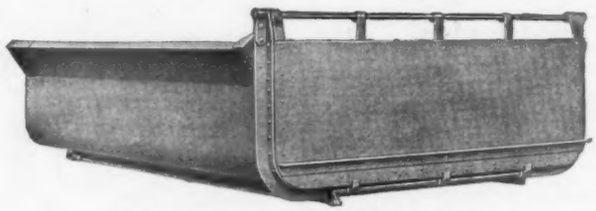
Frank Mossberg Company
Wrenchsmiths **Attleboro, Mass.**

LITTLEFORD STEEL DUMP BODIES

NONE BETTER BUILT

Standard Bodies MADE IN VARIOUS SIZES AND CAPACITIES.

CAN BE ATTACHED TO ANY CHASSIS.



Manufacturers— WE BUILD BODIES TO YOUR SPECIFICATIONS.

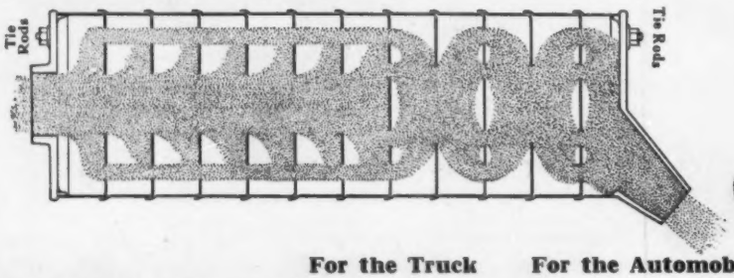
LET US KNOW YOUR REQUIREMENTS.

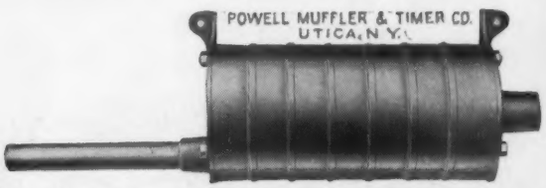
WRITE DEPT. A FOR CATALOG AND PRICES

LITTLEFORD BROS. 453 EAST PEARL STREET CINCINNATI, OHIO

DEMAND Powell Pressed-Steel Mufflers

Won't Blow Up No Loss of Power Won't Leak No Repairing



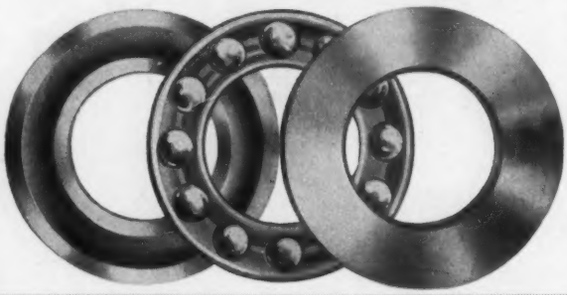


For the Truck For the Automobile For the Ford

POWELL MUFFLER & TIMER CO. **Utica, N. Y.**

The BEARINGS CO. OF AMERICA

OF LANCASTER, PENNSYLVANIA



Builders of Ball Thrust Bearings

Bearings built to your requirements.
Your present bearing sizes duplicated.

"Sterling" Universal Joints
Drop Forgings

Western Sales Office: 1012 Ford Bldg., Detroit, Mich.

The Bearings Co. of America
LANCASTER, PENNA.

Sizes—1⅛" to 3¼"
Prices—$4.00 to $6.00

PETRY CUT OUT

The last word in muffler Cut-Outs, because of its efficiency, its ease of application and its meritorious features. Expels the full exhaust to the rear, not down. Does not splatter mud and stir up dust. Has adjustable lever, making attaching easy; positive cut-off from the muffler. Spring away from heat and easily adjustable; compound lever action and spring makes action smooth and easy on pedal. Valve seat and valve machined to prevent leakage. A scientifically-designed mechanical job. Neat in appearance, strong in construction, thoroughly serviceable. Size plainly cast on each size. Invaluable for "tuning up" the motor.

N. A. Petry Company, Inc. **1319 Race St., Philadelphia**

DISTRIBUTORS: Gray-Heath Co., 1440 Michigan Ave., Chicago, Ill.
Norman Cowan Co., 433 Rialto Bldg., San Francisco, Cal.

DEALERS

HERE'S A BIG, PROFITABLE SELLER

This is the best selling, most practical auto signal of the day—because:

1. It is attached directly on the motor in the priming-cup opening, securing full explosion pressure of the engine.
2. Its clear, insistent, far-reaching blast penetrates above all other sounds, and attracts instant attention.
3. Easy to operate, sensitive to the slightest touch of the whistle cord, never needs adjustment. GUARANTEED for 10 years.

BUELL EXPLOSION WHISTLE

is standard or optional equipment on the passenger cars and motor trucks of 41 manufacturers, including Pierce-Arrow, Mack and Diamond T. This is an auto signal you can confidently recommend. Its superiority over all other warning devices is demonstrated in its adoption by the above-mentioned manufacturers. If you are not already handling this popular signal, write at once.

BUELL MANUFACTURING CO.

2981-83 Cottage Grove Ave.

Chicago

BIG POWER SPARK PLUGS

for Heavy Duty and Continuous Service

The One Inch of Firing Surface—gives a live, crackling shower of ten hot, fat sparks that ignite every charge of every cylinder and burn up all the fuel and carbon—giving more power, quicker acceleration, a smoother running engine and great economy of gasoline.

Price $1.00 Each—at All Reliable Dealers

Booklet which gives detailed description, sizes, etc., mailed on request.

BERGIE NATIONAL SPARK PLUG CO.

604 E. State Street, Rockford, Illinois

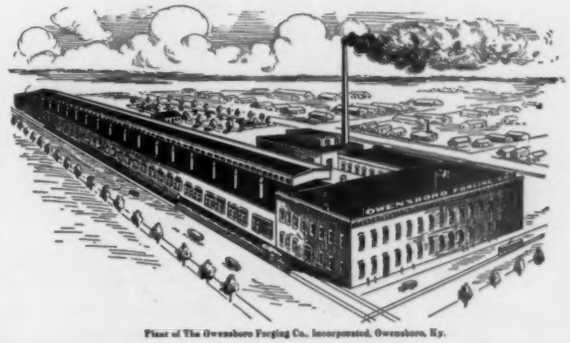
New York Pittsburgh Atlanta San Francisco

OWENSBORO FORGINGS

Represent the Highest Quality in the Production of

Light Drop Forgings for

Trucks—Tractors



Plant of The Owensboro Forging Co., Incorporated, Owensboro, Ky.

We specialize in Top Irons, Commercial Body Irons, Chassis Irons, Tail and Headlight Brackets, End Gate Eye Bolts, Iron Braces, Spring Clips for Trucks, and in fact all types of Light Forgings.

We have a large plant, excellent shipping facilities, and use only high-grade materials.

Send us your blue-prints and let us quote you

The Owensboro Forging Company, Inc.

Owensboro, Kentucky

TITAN

INTERNAL GEAR vs. WORM

Get our bulletin showing "History of Internal Gear"—Record of 4 ton truck, 8 years old. Proof that 93 % of all machinery operated on roadways use gears as Final Drive.

FREE TO ALL LARGE DEALERS

3½ AND 5 TO 6 TON TRUCKS IN DEMAND

TITAN QUALITY. Mighty Buda Motor with power to climb 25 % grade under full load. Rugged Clark Rear Axle—guaranteed for 2 years. ¶ 100 % record in service. ¶ Delivery prompt. ¶ Agency proposition liberal.

TITAN TRUCK CO.

MILWAUKEE - - - WISCONSIN

DOEHLER
BABBITT-LINED BRONZE
BEARINGS

The bronze used in these bearings is of the copper-tin-lead type, alloyed by us from the highest grade metals obtainable. The Babbitt is of the tin-antimony-copper variety, absolutely free from impurities.

Connecting-Rod Bearing On Eight-Cylinder Motor

The Babbitt lining is joined to the bronze shell by a special process, of our own development, which results in a uniform, sound, and homogeneous unit.

The CONSISTENT use of these bearings, year after year, by the most prominent Motor builders in the country is ample proof of their merits.

DOEHLER DIE-CASTING CO.
BROOKLYN. N.Y.
NEWARK. N.J. TOLEDO. OHIO.

Also Die-Cast Babbitt Bearings. Die-Castings in Brass & Bronze, Aluminum and White Metal Alloys

The KOKOMO
Ratchet, Wrench and Socket Set

A quality set—everything that every good wrench has, plus a number of exclusive features. The special speed-up winding crank alone will speed up work 100 to 1,000 per cent. Neatly packed in strong oak case—Handsomely nickeled wrench, blued steel ratchet, copper-handled speed-up crank, extension bar and fifteen pressed-steel sockets.

Write for the Booklet that Tells
PRICE COMPLETE—$8.50

Dealers: If you are interested in a quick-selling proposition that combines exceptional merit with substantial profits, write us at once.

The Kokomo Wrench Co.
Box 3, Kokomo, Ind.

Strength and Simplicity

In presenting the improved Hoosier Dry Disc Clutch to the automotive trade, we emphasize the above qualifications. Hoosier design calls for a super-sizing of stressed parts and the reduction in number of parts to a minimum.

This clutch is instant and positive in action. It has but a single adjustment, which is placed directly against the friction-bearing surfaces. This adjustment will take care of all the wear the discs will stand before replacement is necessary.

Hoosier Single Plate DRY DISC CLUTCH

is logical and right for heavy-duty service on automobiles, trucks and tractors. It will prove a unit of exceptional service in durability, simplicity and freedom from repairs.

We furnish these clutches in both 10 and 12-inch sizes. They will fit all standard makes of motors and transmissions, either unit power or amidship applications. Interchangeable with all other similar types. Let us submit detailed description and prices.

Hoosier Auto Parts Co.
Muncie Indiana

We Are at Your Service

In the months just past we were not able to give commercial business our usual service, because we were bending every effort to the work of helping the government fulfill its obligation to get the war over as quickly as possible.

Now that the war is over, our plant and our equipment will soon again take its place in the forefront of the work of supplying its many patrons with Moltrup Quality Products, including crank-shaft machining, core plates, engraving plates, finished circular plates and discs of all kinds, cold-drawn steel bars, shafting, screw-steel rounds, flats, hexagons, squares, special shapes, finished machine keys, finished machine rack.

Moltrup Steel Products Co.
Beaver Falls, Pa.

CONSIDER THE SERVICE

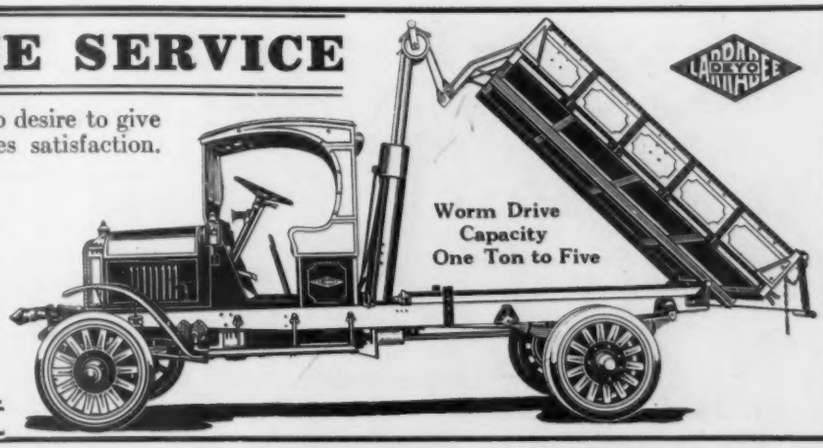
We solicit inquiries from dealers who desire to give to their patrons a service that gives satisfaction.

LARRABEE TRUCKS

are noted for their dependability, honest construction and continuous performance. A Larrabee user is a satisfied customer. Every buyer of a Larrabee not only acquires a superior motor truck, but also a guaranteed service that is unexcelled.

Shrewd dealers are identifying themselves with the Larrabee Truck. Write for interesting information.

LARRABEE-DEYO MOTOR TRUCK CO., INC.
Dept. 33 Binghamton, N. Y.



Write Ames for Bodies for FORDS

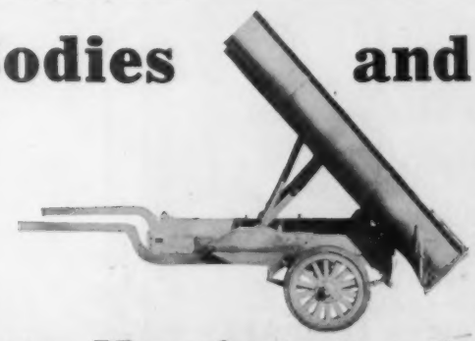
Ames-bilt

Passenger and Commercial bodies, also the Ames-ton Worm-Drive Truck Unit and Commercial Unit. Write.

The F. A. Ames Company, Inc. **Owensboro, Ky., U. S. A.**

Woonsocket Bodies and Trailers

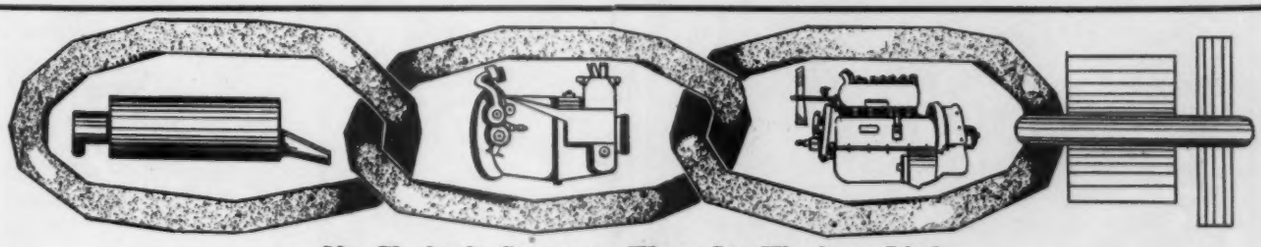
Our Semi-Trailer with Hand Hoist is shown equipped with Steel Body



The only satisfactory Dump-Body Trailer on the market.

Can be attached to any type tractor and will dump any kind of material.

Woonsocket Wagon Manufacturing Company
Woonsocket, Rhode Island



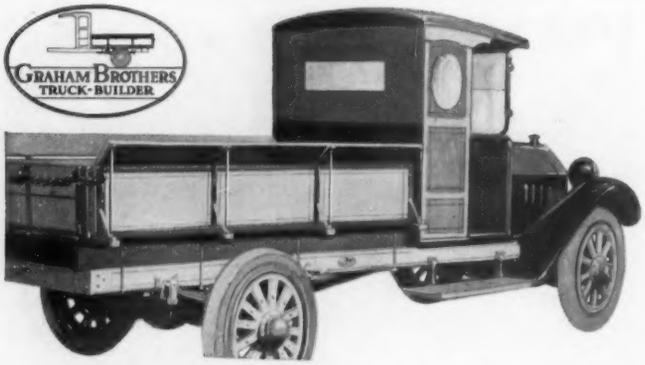
No Chain is Stronger Than Its Weakest Link

The muffler is the weak link in many truck jobs. Avoid that condition in your trucks by using the

Multi-Jector All Steel Muffler

It's the result of 15 years' experience, produces greater engine efficiency, won't blow up, can't wear out, and gives the best service. Write for facts.

Buffalo Metal Products Manufacturing Co. **380 E. Delevan Street, Buffalo, N. Y.**



HUNDREDS of dealers are helping solve their trade-in problems by selling Truck-Builders to owners of used cars and building them into 1, 1½ and 2½ ton trucks.

Graham Brothers Truck-Builder is a truck rear-system, Torbensen internal-gear driven, and made complete with driver's cab and choice of seven body styles, all built by Graham Brothers.

Send for catalog.

GRAHAM BROTHERS
EVANSVILLE, IND. U.S.A.

Schatz "Universal" Annular Ball Bearing

Three Area Contact

Three Area Contact

BUILT FOR THE HARDEST SERVICE

Definitely located contact areas in the outer races **absolutely prevent any binding strain** in the bearing under **thrust loads.**

No truck, tractor or other mechanism having rotating members will ever see sufficiently hard service to jam or wedge the balls in its "Universal" Bearings.

Write for new catalog

THE FEDERAL BEARINGS CO., Inc.
34 William St. Poughkeepsie, N. Y.
Great Britain: 27 Sheen Rd., Richmond, London

It Sells Because It Seals

Here is an ideal replacement for the ordinary leaky piston ring. Its faultless one-piece construction is gaining it universal favor in the truck field, and dealers everywhere are building a growing trade in this important part.

Gill Piston Ring performance has created its prestige. The fact that it positively stops compression loss and reduces fuel and oil consumption makes it an important service item in the hands of dealers who sell service. The profits are liberal. We want still more dealers to help make good engines still better. Your own jobber should be ready for you —if not, address

THE GILL MFG. CO.
351 W. 59th St. CHICAGO, ILL.

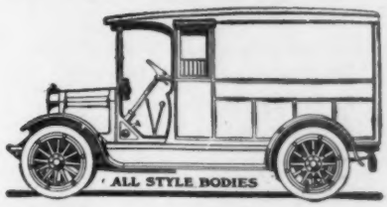
Get Our CATALOG

DETROIT OFFICE
905 Dime Bank Bldg., Detroit, Mich.

F. M. COBBLEDICK CO.
693 Mission St., San Francisco, Cal.

Rainier

WORM DRIVE DELIVERY TRUCKS

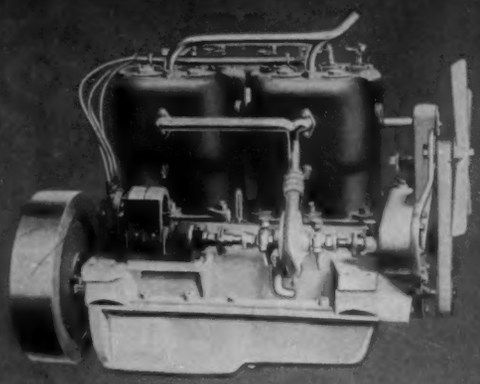


Built like the best known American heavy trucks, with all their successful features, including *worm drive*, Brown-Lipe Clutch and Transmission, deep frame, long wheelbase and special truck motor. Used in quantities by hundreds of leading firms throughout the country with whom first cost is not the deciding factor.

½ ton chassis	¾ ton chassis	1¼ ton chassis	1½ ton chassis
$1250	$1350	$1595	$1890

Rainier Motor Corporation

Factory, Flushing, L. I., New York
Sales Dept., 225-227 West 58th St., N. Y. City



Waukesha

TRADE MARK REG.

Motors for Trucks

are rapidly being adopted as standard by many of America's truck builders, because the combination of Waukesha materials and design produce a degree of efficiency and economy of operation found in no other truck motors.

Truck users—prospective buyers—truck manufacturers—write for *THE FACTS*

WAUKESHA MOTOR CO., Waukesha, Wis.

Pioneer Builders of Truck and Tractor Motors Exclusively

Service on the Road Counts

—it is the one factor that establishes the efficiency and economy of the Electric Commercial Vehicle for short-haul deliveries.

Years of service in every industry, where the Electric Commercial Vehicle is used, have conclusively proved the superiority of

The "Ironclad-Exide" Battery

as an everyday, year-after-year source of power for this particular class of service. Its rugged construction, ability to withstand hard usage, and its dependable, consistent performance on the road have made the "Ironclad-Exide" the standard battery for the Electric Commercial Vehicle.

Have our nearest sales office explain the special positive plate, patented cell cover and non-flooding filling plug—service proved features of the "Ironclad-Exide."

THE ELECTRIC STORAGE BATTERY CO.

The oldest and largest manufacturer of Storage Batteries in the Country

1888 PHILADELPHIA, PA. 1919

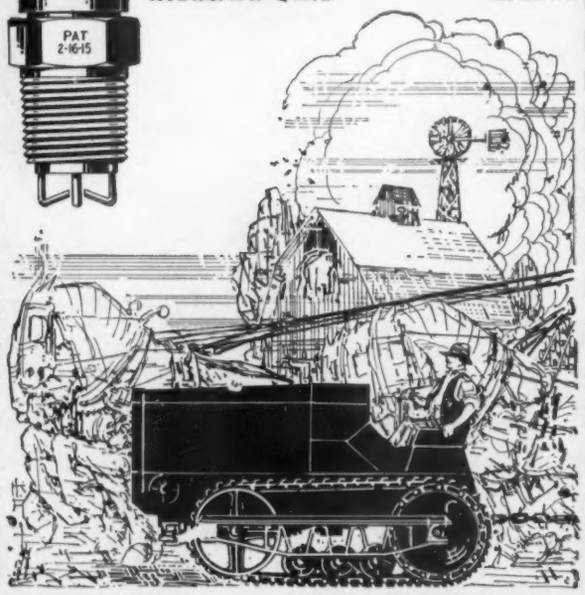
New York Boston Washington Minneapolis Denver Detroit San Francisco Kansas City Chicago Cleveland Atlanta Pittsburgh St. Louis Rochester Toronto

WRIGHT *Taper Roller* BEARINGS

HERCULES SPARK PLUGS

"STRICTLY A QUALITY PRODUCT"

ECLIPSE MANUFACTURING CO.
INDIANAPOLIS U. S. A.



BEARINGS SERVICE COMPANY

BEARINGS SERVICE COMPANY

NEW DEPARTURE TIMKEN HYATT BEARINGS

We are equipped to give you immediately, a National Authorized service on New Departure, Timken or Hyatt bearings, in any size or type.

Our complete stocks and detailed engineering records enable us to supply these bearings for any motor car, truck or tractor made.

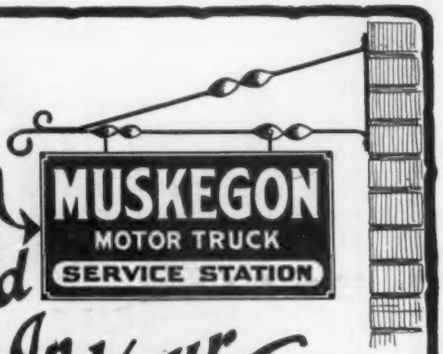
Just mention the year, model and make of car and the location for which the bearing is wanted, and you will get the *correct* bearing *immediately.*

22 Direct Branches
Over 750 Distributors

General Offices
Detroit, Michigan

BEARINGS SERVICE COMPANY

This Sign Should Be In Your Town



It should be right in front of your place of business. Because in a few words it tells a complete story.

It tells motor truck buyers where they can get the most truck value for their money.

It represents more dependable service—greater economy of operation—an ultimate saving that gains the buyer's confidence.

It represents the following parts; **each a guarantee of service:**

Continental Engine (Red Seal)
Torbensen Axle
Bower Heavy-Duty Bearings
Fuller Transmissions
Pierce Governor
Stewart Automatic Carburetor
Stewart Vacuum Feed System
Eisemann High Tension Magneto
Firestone, Solid Pressed-on Tires

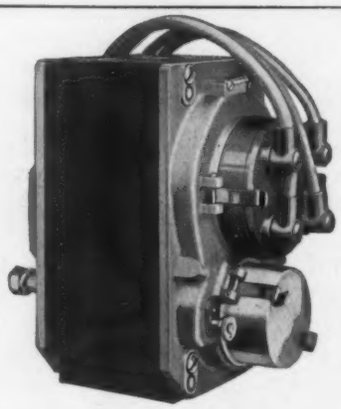
It represents motor truck dealers who have a high standing in their community and are business men through and through.

Write today for special catalog C and complete information.

"Performance Its Proof of Perfection"

MUSKEGON

MUSKEGON ENGINE CO.
Muskegon, Michigan



"A better spark in a simpler way"

The TEAGLE High Tension MAGNETO

for Trucks or Tractors—two, four, or six cylinders—with fixed or variable spark. Conforms to S.A.E. standards. Write for booklet.

THE TEAGLE COMPANY
CLEVELAND, OHIO

"JASCO"
SAFETY FIRST
TANKS

Give You the Use of Every Drop of "Gas" and Prevent Fire and Explosion

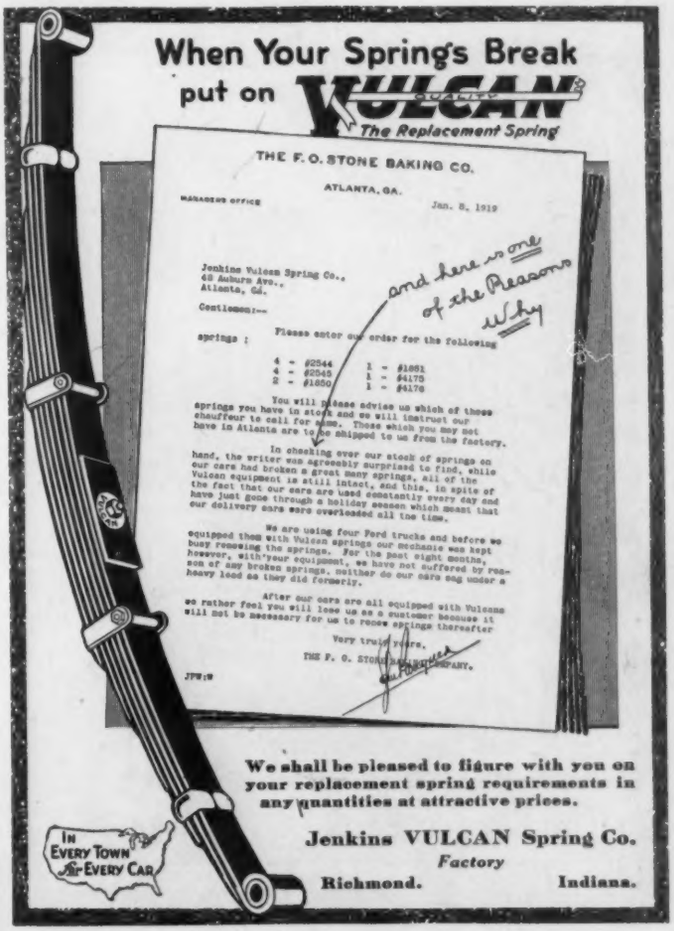
The worth of the "Jasco" Tank is recognized both by pleasure car and commercial vehicle users.

It is the ***absolutely leakless*** gas receptacle—made of the finest steel, drawn, tinned and tested, and positively seamless.

Made in many styles and sizes for automobile or motor boat. Send for detailed literature.

Janney, Steinmetz & Company
MAIN OFFICE, PHILADELPHIA
New York Office, Hudson Terminal Building

When Your Springs Break put on VULCAN QUALITY
The Replacement Spring

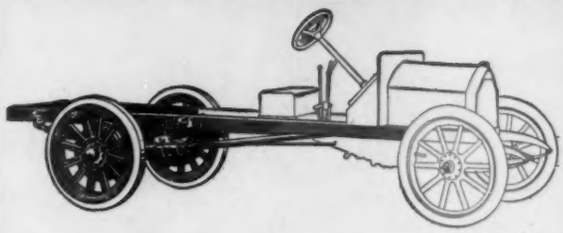

THE F. O. STONE BAKING CO.
ATLANTA, GA.
Jan. 8, 1919
Jenkins Vulcan Spring Co.,
48 Auburn Ave.,
Atlanta, Ga.
Gentlemen:—
and here is one of the Reasons Why
springs :
4 - #2544 1 - #1861
4 - #2545 1 - #4175
2 - #1850 1 - #4176
springs you have in stock and we will instruct our
chauffeur to call for them. Those which you may not
have in Atlanta are to be shipped to us from the factory.
hand, the writer was agreeably surprised to find, while
our cars had broken a great many springs, all of the
Vulcan equipment is still intact, and this, in spite of
the fact that our cars are used constantly every day and
have just gone through a holiday season which meant that
our delivery cars were overloaded all the time.
equipped them with Vulcan springs our mechanic was kept
busy renewing the springs. For the past eight months,
however, with your equipment, we have not suffered by ren-
son of any broken springs, neither do our cars sag under a
heavy load as they did formerly.
so rather feel you will lose us as a customer because it
will not be necessary for us to renew springs thereafter
Very truly yours,
JPW:B

We shall be pleased to figure with you on your replacement spring requirements in any quantities at attractive prices.

IN EVERY TOWN FOR EVERY CAR

Jenkins VULCAN Spring Co.
Factory
Richmond. Indiana.

TRUXTUN
"HUDFORD TYPE"



THE TRUXTUN will convert any car into a sturdy, dependable, 1½, 2 or 3 ton truck. An especial feature is the internal-gear axle drive, the same type as on 90% of "standard make" trucks. TRUXTUNS are now solving the delivery problem of thousands of owners.

DEALERS! An unusual opportunity to open new trade. Exclusive territory with liberal offer. Write for details.

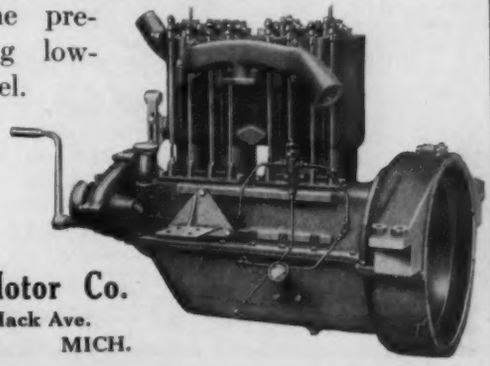
COMMERCIAL CAR UNIT CO.
Oldest and largest makers of shaft-drive trucks
PHILADELPHIA, U. S. A.

GRAY

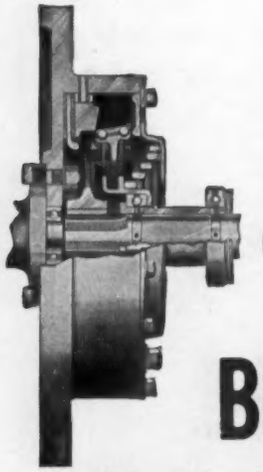
VICTORY MOTOR

4 Cylinder, Bore 3½", Stroke 5"
Valve-in-Head

Embodies special carburetion features giving high efficiency and greatest economy, with the prevailing low-grade fuel.



Gray Motor Co.
2119 Mack Ave.
DETROIT MICH.



BORG & BECK

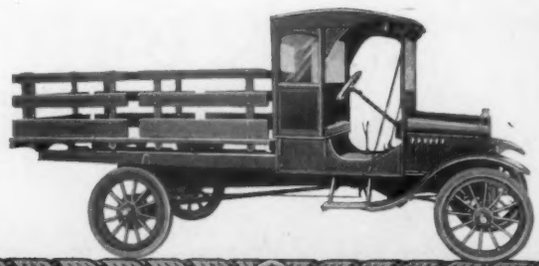
Single Plate Dry Clutch

SIMPLICITY of design, light friction disc, light spring, convenience and infrequency of adjustment, slipping grip, so gradual in action as to make a "starting grab" or "jerk" impossible, mark the commendable features of this clutch.

Note: This clutch furnished, in various sizes, to fit all standard unit power plant transmissions.

The Borg & Beck Co., Moline, Ill.

Largest exclusive automobile clutch manufacturers



Field

DURABLE BODIES For The FORD

Have All The Endurance of The Ford Truck. Built in Interchangeable Units – One Body Does The Work of Several. Quantity Production Guarantees High Quality And Low Cost. Any Style Shipped Promptly Out of Stock. Write For Catalog, Price List & Telegraph Code

WE ARE ORIGINATORS OF THE INTERCHANGEABLE UNIT IDEA IN FORD TRUCK BODIES. WE ALSO BUILD TO FIT ALL OTHER STANDARD MAKES OF TRUCKS

FIELD MANUFACTURING CO., Owosso, Mich. U.S.A.

Largest Exclusive Truck Body Plant in the World

STEEL WHEN YOU WANT IT

HOW WILL YOU EVER KNOW

that Aborn gets whatever Steel you want, any size, shape or quantity, to you quicker than any other concern on earth if you never send in an order? Get to know Aborn service; 'twill be worth while.

A Few Warehouse Items:

High Speed Steels	Tool Holder Steel
Oil Hardening Steel	Vanadium Steel
Chrome and Nickel Steels	Annealed Punch and Die Steels
Tool and Drill Steels	Spring Steels
Pick, Wedge and Hammer Steels	Machinery Steels
Annealed Cutter Blanks	Drill Rods
Music Wire for Springs	Tempered Spring Wire
Cold Rolled Steels	Drawn Steels
Forgings, Specialties	Iron

Aborn Steel Company, Inc.

Century Crucible Steel Works
Ontario Electric Steel Works
30 Clarke Street, New York, N. Y.

Boston, Mass.....171 High Street
Buffalo, N. Y.....520 Marine Bank Bldg.
Philadelphia, Pa.....269 Drexel Building
Rochester, N. Y.....133 Andrews Street

190

The Redden Line

offers a triple solution to every transportation problem.

If your problem is one of short hauls and light loads, the REDDEN PERFECTED ATTACHMENT for Ford Cars *solves* it.

For heavier hauls and greater load capacity, the REDDEN UNIVERSAL ATTACHMENT, which fits any chassis, will give you a truck which will fit your business.

And if you seek 100% Trucking Efficiency, the REDDEN TRAILER will give it to you.

Redden Motor Truck Company

Chicago, Ill., U. S. A.

CHAMPION

DROP FORGINGS

Axles---Gear Blanks---Cranks

Heading Machine Forgings
Steam Hammer Forgings

We have the facilities to serve you promptly, efficiently and economically on any of the above. Send us your blue prints for estimates.

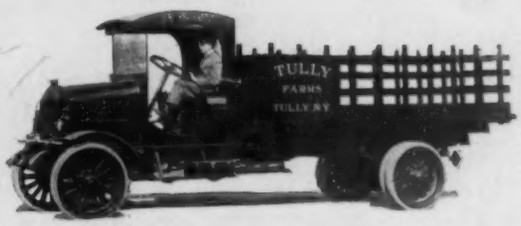
The Champion Machine & Forge Co.
CLEVELAND, OHIO

THE Sanford MOTOR TRUCK

Worm Drive **2½, 3½, 5 Ton**

They Deliver Satisfaction

SANFORD TRUCKS



3½ ton Sanford stake-body truck, bought by Tully Farms, Tully, N. Y. Leading producers of highest-grade milk and cream.

The vital need for efficient transportation of perishable products makes it essential that the progressive farmer, stock raiser, dairyman and fruit grower get a truck that satisfies.

Sanford trucks are daily demonstrating their worth for promptness, also for protection of goods in transit.

Immediate Deliveries

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All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U.S.A.

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GRAPHITE AND BRONZE

OIL-LESS BUSHINGS

The new **Oil-less Bushing** catalog contains some useful hints on car, truck and tractor chassis lubrication—on the prevention of neglect at inaccessible bearing points—and other information of practical value to designers and users. Sent free on request.

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Specialists in the manufacture of Oil-less Bushings for more than a third of a century
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You know the

RAYFIELD CARBURETOR

It has earned its reputation for efficiency by years of satisfying performance on all types of motors.

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21st and Rockwell Sts. **Chicago**

SCHACHT
WORM DRIVE TRUCKS

A line that carries the highest guarantees of durability, power and simplicity. In these qualities lie the Schacht definition of "Service." Selection of materials, quality of workmanship and close attention to construction details make a finished product of which any Schacht dealer may boast.

This Representation

is worth having. It calls for high calibre dealers—those who believe in real service and insist on selling it. If you are of this type, communicate with us.

The G. A. Schacht Motor Truck Co.

Chicago Branch 2021 Michigan Ave. | New York Branch 422 E. 54th St.

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PANHARD
—the Twin-Frame Truck

1½-Ton $1395 Chassis

1-Ton $1195 (Chassis)

Extraordinary Dealer Proposition
Write for it

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Grand Haven Dept. 27 Michigan

M&S
SELF-LOCKING DIFFERENTIAL

Locks when one wheel loses traction in mud, snow or sand, and delivers the power to the wheel that has traction.

A truck with an M & S Differential doesn't stall in hard winter going and doesn't skid on wet pavements.

Tires last longer because wheels never spin.

M & S Differential has been adopted by prominent Truck Manufacturers and Truck Axle Manufacturers.

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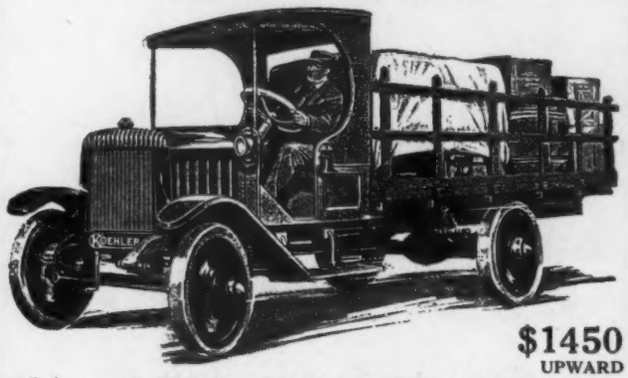
TRADE MARK

Trucks and Tractors
THE "GO GETTER" LINE



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UPWARD

1¼ to 5 TON CAPACITY TRUCKS

ALSO

3-5-7 and 10 ton Tractors that outdemonstrate by a wide margin any other hauling units in their classes.

Koehler Motors, Eisemann Magneto, Stromberg Carburetor, Torbensen Axles, Koehler Finhead Radiator; long, wide springs and generous tire equipment. Details on all models on request. Also 24 page catalog.

DEALERS—Send for our liberal Selling Plan

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Super-Duty Trucks

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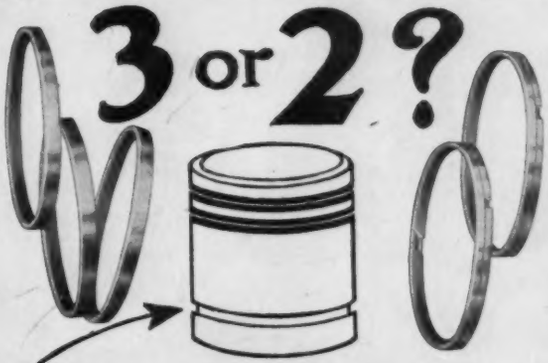
A number of desirable agency territories are open for dealers of responsibility who know how to sell high-grade trucks. Write us for details.

WARD LaFRANCE TRUCK CO., Inc.
ELMIRA . . . NEW YORK

3 or 2?



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The most grilling tests prove that two R & M Conform Rings will give more satisfactory service than three rings of the ordinary type. They do this because they are built right—along scientifically correct principles.

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DROP FORGINGS

These are but a few of the many automobile forgings upon which we have built a reputation. Our facilities are complete, our service prompt and the quality of our forgings unsurpassed. We can satisfy you.

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SWISSVALE, PA.

Two miles east of Pittsburgh, Pa.

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Requires CASTINGS of the Better Kind?

LET US GET TOGETHER

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Indianapolis and Detroit

Making ELECTRIC STEEL CASTINGS of the Highest Grade—

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Laminated "V" Fan Belting
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Vee Flex is a flexible "V" shaped belting for use in "V" fan pulleys. Each lamination both underlaps and overlaps the other, and is securely riveted. Made of highest-grade oak-tanned leather. Practically noiseless in operation—a giant for strength. 50 and 100 ft. spools, in ½", ⅝" and ¾" widths.

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PRESSURE PROOF PISTON RINGS

Pat. Mar. 2, 1915, Feb. 29, 1916

The abnormal demand for PRESSURE PROOF PISTON RINGS during the past year is the result of performance—not claims. With the elimination of inefficient methods comes a real appreciation of this PISTON RING which permanently eliminates Carbon, increases compression and cuts down oil and fuel expense.

Diagram showing the principle of operation of Pressure Proof Piston Rings to be mechanically correct.

"The Ring with The Spring"

One Pressure Proof 3-part ring, or two Pressure-Proof 2-part rings are a full piston equipment.

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107 Massachusetts Ave.
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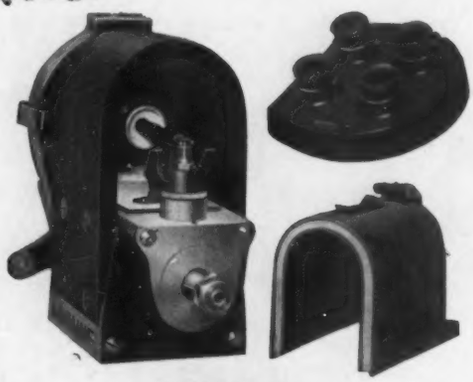
Lauraine MAGNETO
SANS PEUR SANS REPROCHE
MADE IN U. S. A.



Quality
High Tension Dust-Waterproof

Precision
Adopted by the Allied Governments

Lauraine Magneto Company, Inc., 1765 Broadway, New York

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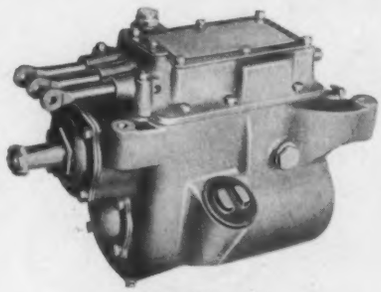
DETROIT GEAR & MACHINE CO.



MODEL H

TRUCK TRANSMISSION
4 SPEEDS

Amidship type, for 1½–2 and 2½ ton trucks. Also furnished for unit power plant construction, with clutch.

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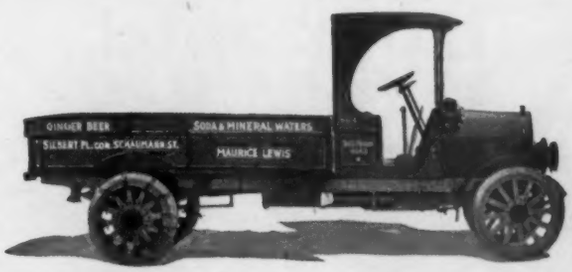
Detroit, Mich.



1½ Ton Worm-Drive Chassis, $2150 00
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Buda Motor **Brown-Lipe Clutch**
Bosch Magneto **Timken Worm Drive**
Brown-Lipe Transmission
Timken Bearings Throughout

This high-grade Transmission and Power Plant is mounted on a chassis exceedingly well designed and very substantial.

You will find this a profitable line to handle.

The durability and efficiency of these trucks enable you to secure your customers' repeat orders and build up a clientele of satisfied users.

Sullivan Motor Truck Corporation
Rochester, N. Y.

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(a tape recorder)

A graphic record for every inch the car moves—forward or backward. A written log of time, distance, speed and stops. Fits any car or truck. *Write for booklet.*

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Mfrs. of Jones & Popp Taximeters, 16 West 61st Street, New York
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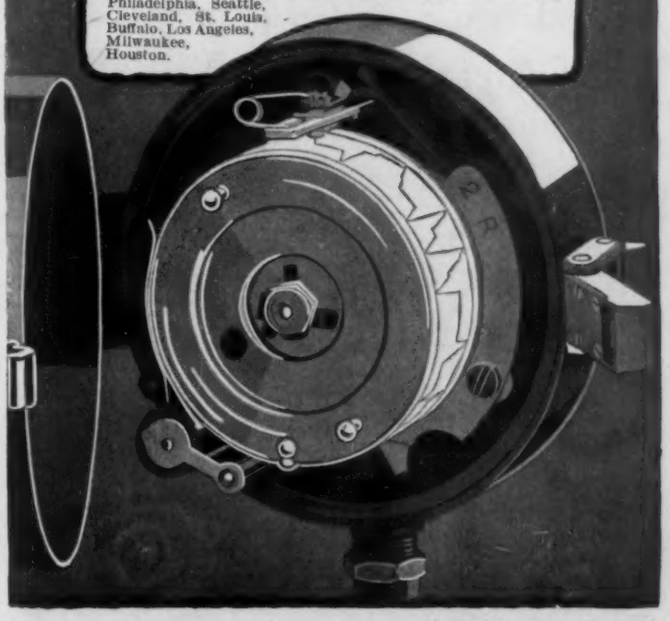

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No. 16 Gauge Steel
Terne Coated
All Seams Welded
No Rivets—No Solder
Deliveries Guaranteed

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Established 1850

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Makers of

Maluminum Castings

announce the placing on the market on June 1, 1918

Kramm Bearings

(Guaranteed)

for

Trucks, Tractors and Aeroplanes

These bearings will be furnished in the rough, ready for machining

SEND US YOUR SPECIFICATIONS
and we will be pleased to quote on your requirements

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Heavy-Duty Truck Axles
High-Grade Drop Forgings
Pressed Steel Frames
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UTICA, N. Y. PHILADELPHIA, PA.
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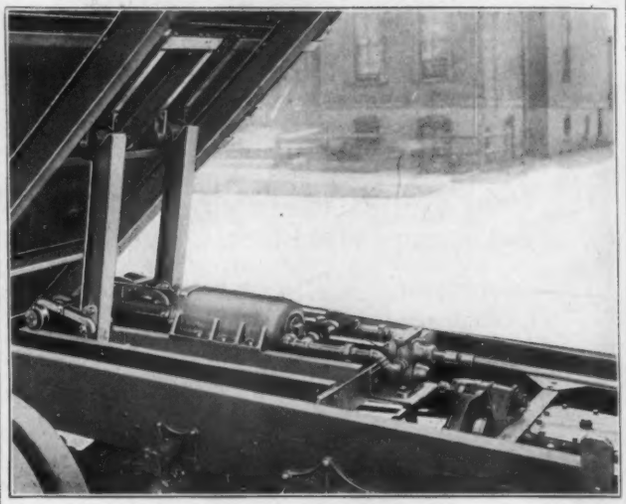
Executive Offices: 50 Church St., N. Y.

SAVAGE QUALITY TRADE MARK

HORIZONTAL HYDRAULIC



THE MOST EFFICIENT HOIST

The Lifting Arms act directly against Rollers attached to the under side of the Body—no wire ropes used.
This is only one of many superior features.

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31 to 37—25th St. Milwaukee, Wis.

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EGYPTIAN FIBRE

This is the toughest, most durable fibre known and is used by many truck makers for washers, gaskets, bushings, because of its superior qualities.

It is very durable, free from carbon, hard, and close-grained, slow to absorb and very resistant to shock.

Send for samples or consult our development department regarding their use in your trucks.

Delaware Hard Fibre Co.
Wilmington, Del.
NEW YORK OFFICE:
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CHICAGO OFFICE:
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Average Service Better Than 10,000 Miles

TO DISTRIBUTORS AND DEALERS

We have an attractive selling plan. Write today if you want to sell a high-grade tire to truck owners who want the best.

Indian Tire & Rubber Company
New Brunswick New Jersey

THE GENERAL TIRE

Generals measure more miles. Quality and performance are the first consideration in their manufacture—not price.

That's why they always turn over a good deal for the user and dealer.

Goes a Long Way to Make Friends

The General Cord Tire **The General Fabric Tire**

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Built in Akron by

The General Tire & Rubber Co.

FULTON MOTOR TRUCKS

FARMINGDALE, LONG ISLAND
"AT THE PORT OF NEW YORK"

"Triple-heated" gas the secret of Fulton economy

Fulton one-and-a-half-ton trucks average from 12 to 14 miles to the gallon—in more than three hundred different lines of business.

This gasoline economy—hitherto unheard of in a truck—is the result of the "triple-heating" of the gas, an exclusive Fulton feature. By means of this super-heating, every ounce of fuel energy is made to deliver its maximum of driving power.

Tire economy is assured by the adoption of the internal-gear drive axle, acknowledged to be not only the ideal type for motor trucks but the easiest on tires.

Send for our booklet "Triple-Heated" Gas.

The Fulton Motor Truck Company

Capacity 1½ Tons **Farmingdale, Long Island, N. Y.** **Price $1850**

Distributors in principal cities

Write for open territory

Standardized Air Brake Equipment brings to the Motor Truck Industry the same Safety, Economy and Reliability that it has to the Railroads.

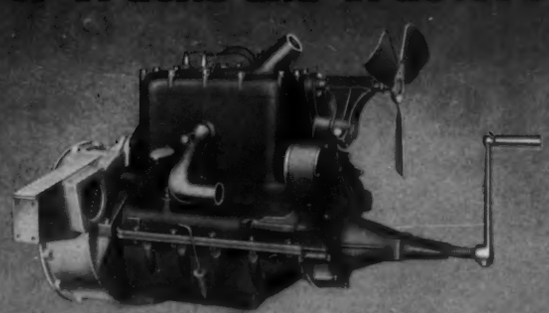
The Parker Pneumatic Control is a system of Air Brakes composed of Standardized Units designed especially for Motor Vehicles and suitable for mounting on any Truck or Trailer.

We are prepared to design mountings for the various units to conform to the structure of your truck or trailer. Send for catalogue

The Parker Appliance Company, Inc.
Cleveland, Ohio

LIGHT MOTORS

For Trucks and Tractors



Light Motors Show the Way
3¼ x 4½, 4 cylinder
What our customers say of our motors:
"We are using the LIGHT motor in our trucks and are going to continue to use them, as we consider them as good, if not better, than any motor of the same size made in this country."
Write us today for complete information

Light Mfg. & Fdy. Co. Pottstown, Pa.

They Make Good Everywhere

This F-W-D Truck, negotiating a hub-deep wallow of stiff, heavy clay, offers a convincing demonstration of the reliability and efficiency of

BLOOD BROTHERS UNIVERSAL JOINTS

These joints make good everywhere regardless the service they are called upon to give. Their dependability has made them the standard joint for trucks, automobiles, tractors and power boats.

Oil-tight—positively lubricated—extra large bearings—compact "can-less" design—a size for every purpose. Built by the pioneer makers of universal joints since 1904.

Write for Booklet L

Blood Bros. Machine Co.
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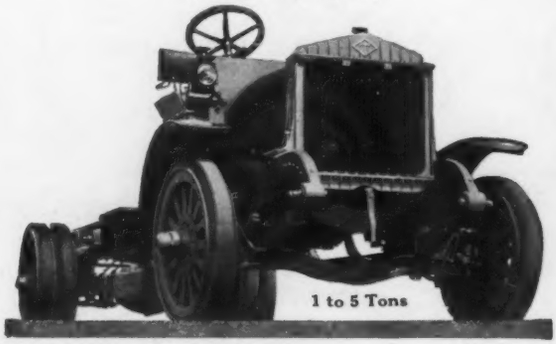
DIAMOND T
THE NATION'S FREIGHT CAR

THE prestige of Diamond T Trucks is the permanent reputation which is based upon many years of unfailing service.

Write for Full Particulars and Agency Terms



Diamond T Motor Car Co.
4509 W. 26th St. Chicago

WE SPECIALIZE ON

PISTON PINS VALVE TAPPETS

AND THE HARDENING AND GRINDING OF OTHER SMALL PARTS

DIE CASTINGS — SMALL STAMPINGS

Economically Manufactured in Any Quantities Large or Small

PRECISION PRODUCTION

A wide variety of machine work in separate departments of Millers, Screw Machines, Automatics, Grinders, Lathes, Drill Presses, Punch Presses, Hardening and Enameling Furnaces, Plating, Assembly and Tool Manufacture.

The RECORDING DEVICES COMPANY
554 West 5th Street DAYTON, OHIO

Superstrength—road shock absorption—long life under every climatic condition—freedom from flaws and unseen weak spots—ease of repair—lightness in proportion to strength and low cost.

These are the splendid qualities that have made

SCHWARZ WHEELS

dominant in the truck and passenger car field. Schwarz construction methods include a patented interlocking spoke construction which insures a rigid spoke-center construction which will withstand the greatest strains.

For every service reason Schwarz Wood Wheels should be specified.

PATENTED
The SCHWARZ WHEEL CO.
Frankford, Philadelphia, Pennsylvania

The Kelly-Springfield Truck Franchise

IN a few open territories where sales can begin at once, the Kelly-Springfield franchise is of genuine value to dealers who realize that successful truck selling is more than a matter of taking orders.

We want men thoroughly familiar with haulage problems in their territory—men who understand fully the responsibility of service—and who realize that they are to represent a great organization that has jealously guarded its reputation during twelve successful years.

To men able to meet our requirements, the Kelly-Springfield franchise is of decided value.

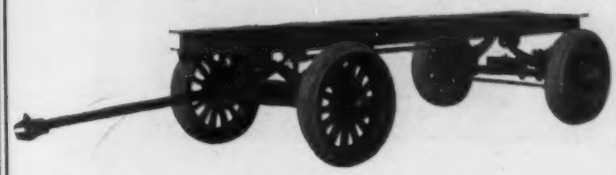
The Kelly-Springfield Motor Truck Company

SPRINGFIELD OHIO

All-Steel *Ever-Wearing*

ROGERS TRAILERS

Cut Expense *Raise Profits*



Trailers are vital to economical heavy haulage. Operating expenses can be cut because a truck can handle three times as much as it can carry. Obviously, three trailers are cheaper than three trucks. Business men with delivery problems can't afford to be without trailers—they raise profits for them as well as for the dealers who meet the demand.

Rogers Brothers All-Steel Trailers are the result of twenty years' experience in steel engineering and manufacturing. Rogers Brothers All-Steel Trailers are ever-wearing—many a one has traveled over 100,000 miles without showing, according to the buyers, any appreciable sign of wear.

Rogers Brothers Short-Turn Gear Trailers are light running, and rear wheels follow in tracks of front wheels when turning a corner. They can be drawn from either end and be backed successfully. Made to stand the hardest usage. All sizes up to 10 tons capacity. They are brutes for strength. Every ounce of stress, strain, vibration, jerk, jar, carrying stress, etc., is met by proper design and construction.

Write us at once for our dealer proposition. We offer a highly profitable connection to aggressive men capable of handling big business.

Ask for Catalog "J"

ROGERS BROTHERS COMPANY

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A STANDARD BEHIND A NAME

ELECTRIC STEEL CASTINGS

We strongly recommend these castings to tractor builders, especially for gear blanks, front forks, steering knuckles, etc.

Electric Steel Castings, made by our exclusive process, are soft, tough, faultless and immune in structure to crytallization, the cause of fractures which often occur in ordinary castings.

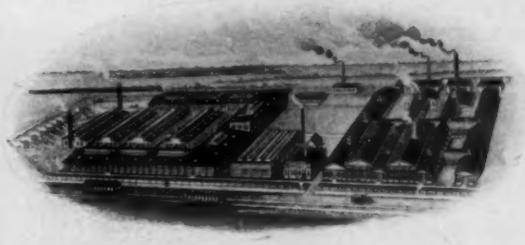
Our products will stand the heaviest vibrations, knocks and jars known to tractor operation. They will, therefore, be a strong factor of safety in tractors so equipped. Let us quote you.

S. FAIR & SON, INC.

VANADIUM ELECTRIC STEEL CASTINGS — AUTOMOBILE CASTINGS OUR SPECIALTY

SAGINAW, MICH.

The New Model Plant



With this impressive assemblage of buildings, equipment and personnel, we are in a position to make immediate deliveries of high-charactered

DROP FORGINGS and CASTINGS

in quantities, from the largest to the smallest. Truck designers should get our quotations on the following, before specifying:

Aluminum, Bronze, Brass, Copper and Composition Castings

We also carry in stock a full line of bronze rods and bushing castings, and handle general machine and tool work.

The Harley Company

Springfield Massachusetts

Get Catalogue 501

Builders of

Standardized Bodies for Heavy-Service Motor Trucks

The Kilbourne & Jacobs Mfg. Co.

Columbus, Ohio, U. S. A.

Offices at New York and London

WILSON TRUCKS

are the product of more than 35 years' manufacturing experience in building heavy-duty transportation vehicles. Strength, durability and efficiency are built into each and every part. They will solve your transportation problems. Our dealer's proposition is unusually attractive.

J. C. WILSON COMPANY
487 WARREN AVENUE WEST, DETROIT

CULLMAN SPROCKETS

in stock and to order

For Block, Roller and High Speed Silent Chains
New Catalog

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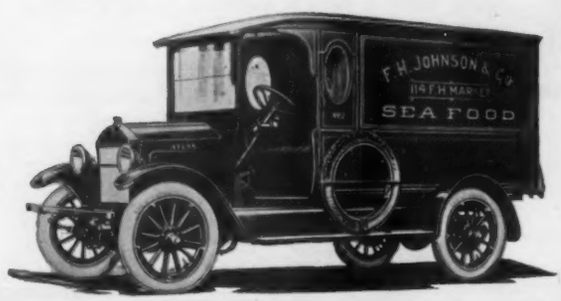
ATLAS OVERSIZE 3/4 TON TRUCK

"Built for Your Business"

No three-quarter-ton truck on the market can meet the Atlas standard—it is unquestionably alone in the field. 118-inch wheelbase; rear axle of full ton capacity; Atlas motor, 3½ x 5 inches; increased piston displacement; over-sturdy dreadnaught type; armor-clad radiator.

Thirty-Three Body Types



Martin Truck & Body Corporation **York, Penna.**

CORBITT MOTOR TRUCKS

offer the farsighted dealer a form of "service" which is a further sales stimulator. This we call *"Corbitt Factory Service,"* with state and local dealer co-operation. It affords speedy and economical co-operation which truck buyers are quick to appreciate.

Dealers—We know the requirements of every prospective buyer, whether of big or little business needs. We have studied them—and we have now on the market six models. These will take care of the small merchant or the big shipper—and those intermediate.

We can appoint a few more active, enthusiastic dealers in unoccupied territory. To those with whom we connect we will give a splendid sales plan.

Here are specifications of our 3½ ton model. Write for details of the other five of the "Corbitt Family"—also for our *DEALER* proposition.

Built in 1, 1½, 2, 2½, 3½ and 5 ton sizes

SPECIFICATIONS:

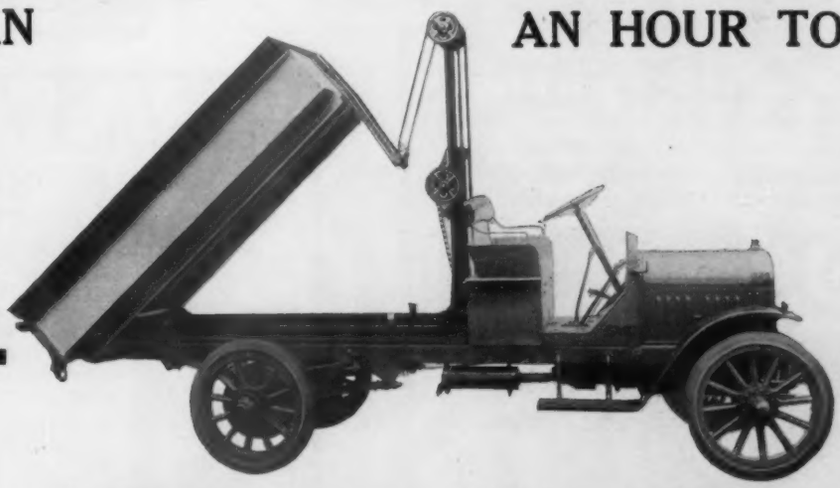
Continental Motor
Brown-Lipe Multiple-Disc Clutch
Ross Steering Gear

Sheldon Worm-Drive Axle
Eisemann Magneto
Tubular Radiator
Wheelbase 168", 178", 195"

Brown-Lipe Transmission
Stromberg Carburetor
7" Channel Steel Frame

Corbitt Motor Truck Company **Henderson, North Carolina**

LESS THAN AN HOUR TO FIT ANY CHASSIS WITH THE



ARCHER STEEL DUMP BODY AND HAND HOIST

Both fleet owners and single truck owners like ARCHER Steel Bodies and Hoists, because there is no upkeep expense and deliveries are speeded up.

Drivers like the ARCHER Dump Bodies and Hoists, because the work is easy and there are no repairs to make.

And YOU, Mr. Dealer, will like ARCHER Bodies and Hoists, because they increase your sales to bulk delivery men and they double your profit.

Tell us the name of the truck you handle and let us give you details and quote prices and discounts.

WRITE RIGHT NOW

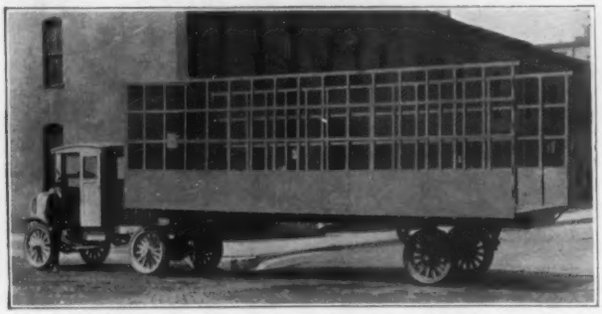
ARCHER IRON WORKS, 2442 W. 34th Place, CHICAGO

Makers of the famous ARCHER Concrete Mixers

LEE LINE

Trailers—Bodies—Loaders

SEMI-TRAILERS



Semi-trailers, which have found such a wide use in the lumber hauling field, are equally well adapted to the transportation of coal, sand and gravel, if suitable dump bodies are provided. For obvious reasons the side dump is preferred.

Lee Semi-trailers can be equipped with side dump bodies in one, two, three or four sections as desired, allowing mixed loads to be carried; each section dumped at a different point. Dumping by gravity, the difficulty of carrying power from the engine to trailer is avoided.

We also provide semi-trailer equipped with stake and express bodies of all sizes. All chasses equipped with Martin rocking fifth wheel, Timken bearings, radius rods and S. A. E. wheels and tires.

Roller tripod jack, for supporting trailer when truck is removed, furnished as extra equipment.

The Lee Line Way
Makes Motor Trucks Pay

LEE LOADER & BODY CO.

Builders of Automotive Auxiliary Equipment

2333 So. La Salle St. **Chicago**

A Paige Truck is a Preferred Investment

The best Truck Dealers of the Country have been quick to recognize the prestige, profits and permanence of a line that is backed by the stability and world-wide popularity of the Paige.

PAIGE-DETROIT MOTOR CAR CO., DETROIT, MICH.

PAIGE

The Most Serviceable Truck in America

MOTOR TRUCKS

Stop the Leaks—

if you want increased profits.

Of all the sources of waste, an inaccurate, incomplete mailing list is one of the most prolific. Your printed matter is expensive to produce, the cost of mailing is a large item; hence it is vital that your messages reach *live* concerns.

By using the

Chilton Trade List

waste in postage and printed matter is reduced to the minimum. The percentage of returned, undeliverable mail matter is smaller than in any other list, as hundreds of users attest.

CHILTON TRADE LIST of Dealers, Garages and Repair Shops, is furnished free to annual advertisers in CHILTON AUTOMOBILE DIRECTORY. May we tell you just how you can secure it?

Chilton Automobile Directory

Market and 49th Streets **Philadelphia, Pa.**

NOBLE MOTOR TRUCKS

Three Models
1½, 2½ and 4 Tons

Continental Motors
Sheldon Worm-Drive Axles
Detroit Pressed-Steel Frames
Fuller Transmissions
Kalamazoo Springs
Long Radiators
Ross Steering Gears
Eisemann Magnetos
Stromberg Carburetors
Oakes Fans
Stewart-Warner Vacuum Feeds
Pierce Governors

Regular equipment includes cab with curtains, windshield, oil side and tail lamps, jack and tools.

Substantial electric light equipment furnished at nominal cost.

Bodies built in our own factory.

Nothing Sells Like Quality

Noble dealers have the distinct sales advantage of the highest standard of quality in both materials and workmanship.

Satisfied customers and repeat orders tell the story of Noble Service. These are salient features, characteristic of Nobles.

Write for our liberal plan for dealers. Limited choice territory open.

Noble Motor Truck Corporation, Kendallville, Indiana

VICTOR TRUCK BUILDER

DEALERS: You have got to consider the term "quality built" when the manufacturer "shows the goods." We are taking the cover right off of this line of 1, 2 and 3 ton models. Look for yourself.

Three drives—chain, internal-gear and worm (the only truck builder using the Clark Internal-Gear Axle and the famous M & S Locking Differential as standard equipment). No extra charge. This means 93% more efficiency.

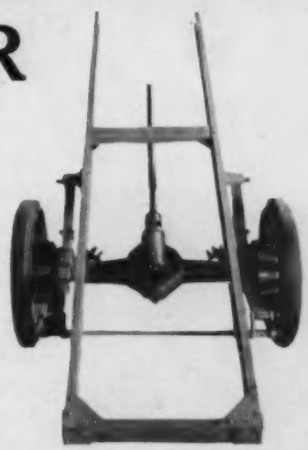
Here are more Victor quality sales-making parts: Hyatt, Strom, Tuthill, Bower, Acme, Bimmel, Goodyear, Firestone, Clark. This is the only truck builder using alloy manganese steel springs.

Victor truck builders have been

Sold Until Now Without Solicitation

We are now spreading out. We have right here in cold iron and steel: design, parts, construction, all. This is the sturdiest, most serviceable truck builder ever made to sell at any price.

We have given you information enough right here to "sell you" on that statement. Our successful business shows that we do things right.



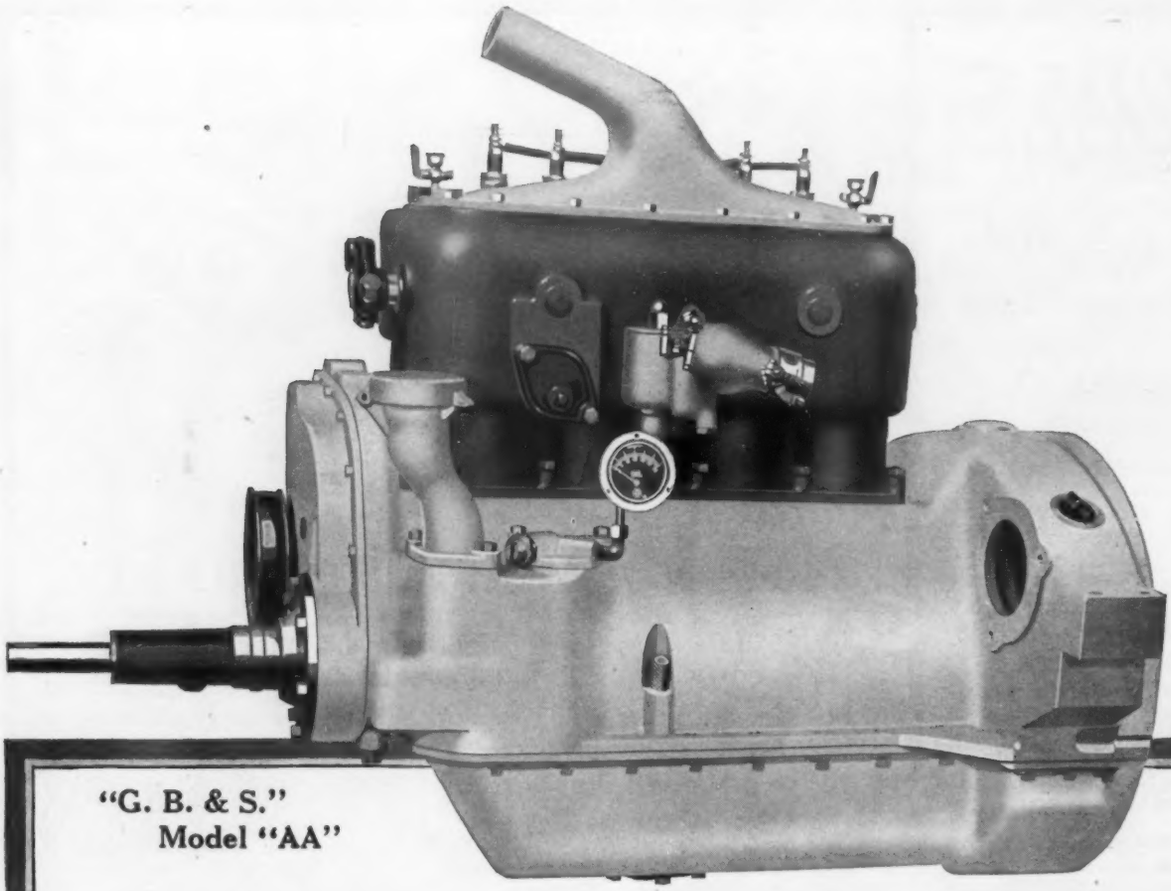
We want responsible dealers. Does this mean **you?**

Are You the Dealer

to put your shoulder to this proposition? Do it and you will find little resistance. This is the truck builder to sell. Write and we will prove it.

Victor Truck Co.
St. Joseph Mich.

CHICAGO OFFICE:
59 E. 24th Street 'Phone 7628 Col.



"G. B. & S."
Model "AA"

A new truck and tractor motor of the most modern design

Built by engine manufacturers who, for ten years, have specialized on four-cylinder motors, this 3¾" x 5" Model "AA" G. B. & S. motor is *especially designed* for truck and tractor service. It shows remarkable efficiency with the use of low-grade fuel.

Engineers who have seen this new model all agree that it unites precisely those attributes that make for success in truck and tractor service.

We believe that it is the most beautifully designed and finely built motor of its size ever produced.

We are prepared for quantity production, and to this end are lined up for machine work, with such nationally-known companies as the H. J. Walker Co., Cleveland; The Automobile Crankshaft Corporation, Detroit. Our "Lynite" crankcases are by the Aluminum Castings Company, of Cleveland.

If you can use a motor of this size and type and quality, it will pay you to write us at once for further details.

Golden, Belknap & Swartz Company
Detroit, U. S. A.

G·B&S motors

Guide TRUCK LAMPS

Tremendously Popular Because Tremendously Successful

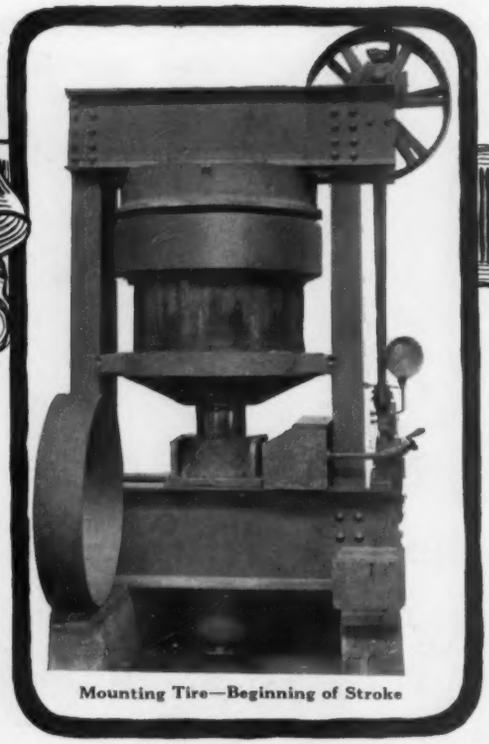
Guide Lamps have become tremendously popular. The demand is so great it constantly keeps us hustling to keep up with it. Why this great demand? Simply this—the Guide Lamp is tremendously successful as a road illuminant.

Truck, car and tractor makers are using Guide Lamps because they give a clear, bright light; because the light is thrown where it is needed—straight ahead and with proper side distribution; because they are sturdily built and have long life, and because buyers of their products are so well satisfied with the lighting equipment.

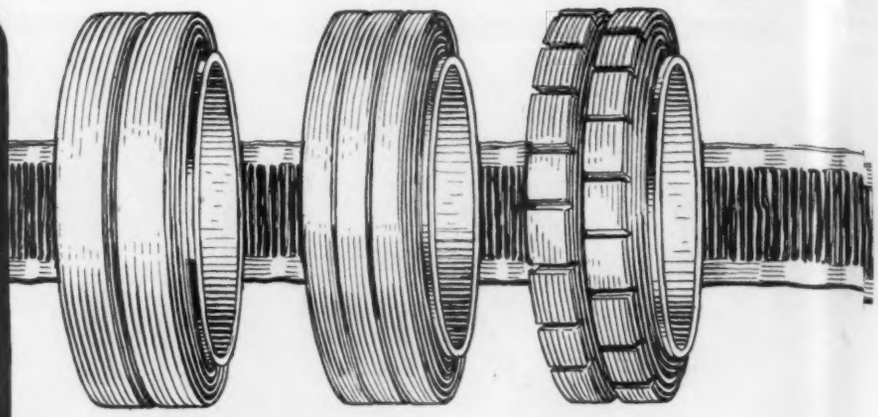
Though our business is growing so rapidly we are making our production facilities keep pace with this growth. We are, therefore, able to take on new business as offered and give it proper attention.

The Guide line includes models for all purposes. Many makers, however, prefer to have lamps of distinct individuality. If you are one of that class, our engineers stand ready to co-operate with yours in designing a lamp that will meet your exact requirements. Whether the lamp be stock or special, the Guide-equipped truck is certain to give the utmost satisfaction in its lighting equipment.

The Guide Motor Lamp Mfg. Company
Cleveland, Ohio, U. S. A.



Mounting Tire—Beginning of Stroke



BRUNSWICK FIRESTONE GOODYEAR

W-S-M

Adopted as

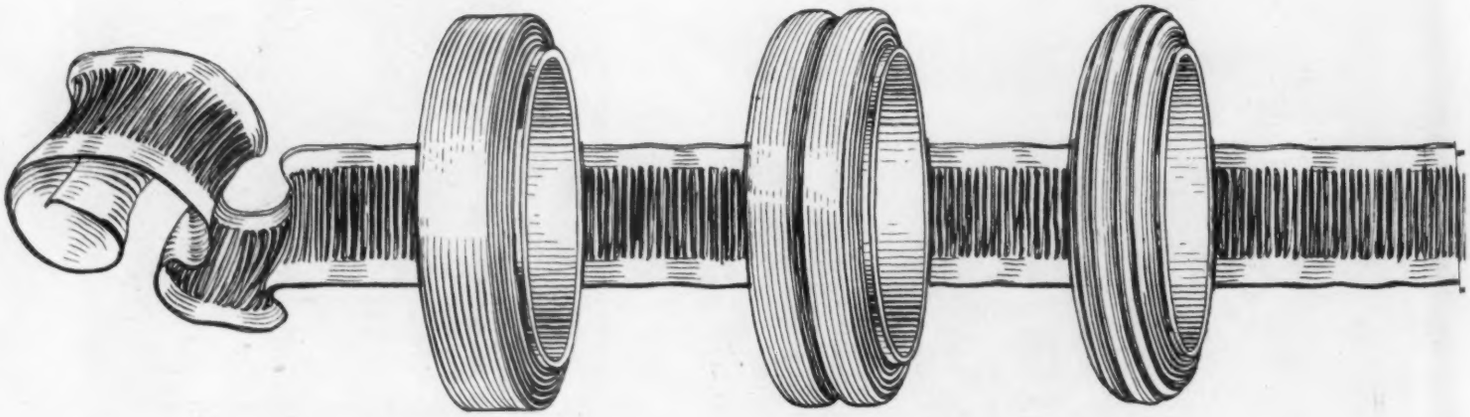
The LEADING MANUFACTURERS

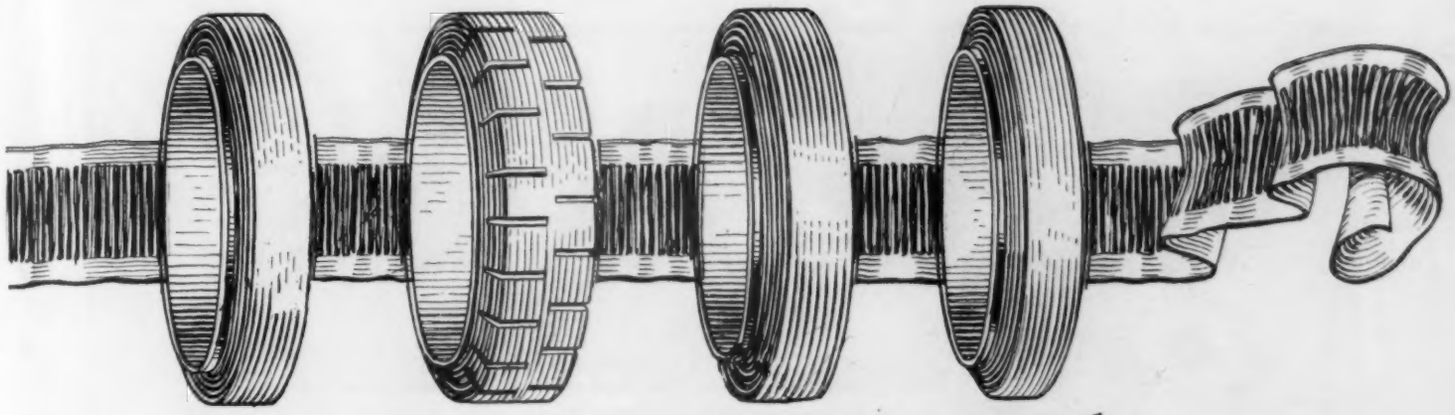
THE manufacturers whose tires are shown on these pages turn out a very goodly percentage of the nation's truck tires. That their service stations may mount tires in the best and easiest way, these companies are equipping their stations with W-S-M Tire Applying Presses. Their endorsement is based on the points of strength, simplicity and ease of operation.

Any dealer with a W-S-M Press can build a growing business on a "double-profit" basis. He can sell the tires and mount them, giving immediate local service.

McGRAW

OWEN POLACK





HOOD Kelly-Springfield Kokomo MASON

TIRE PRESS

Standard by

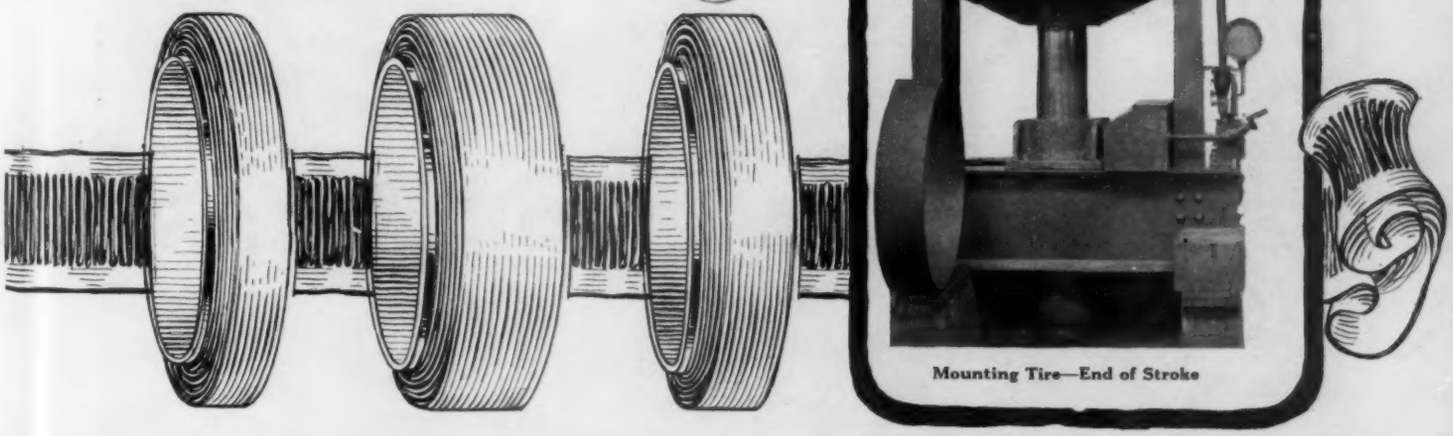
OF SOLID RUBBER TIRES

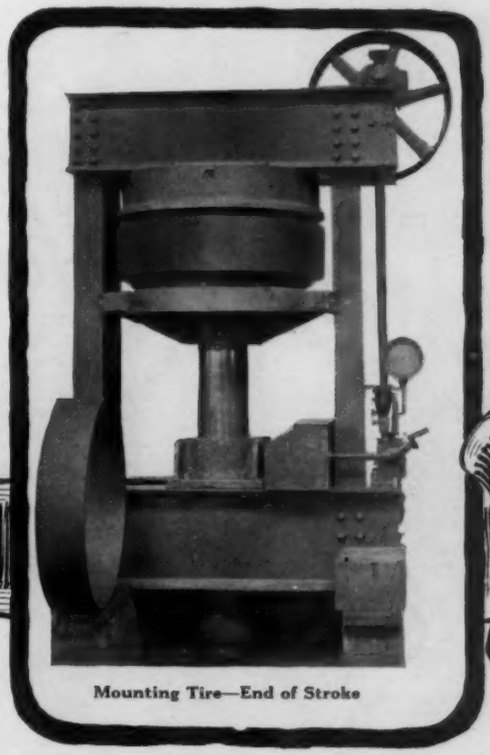
Beyond the direct profits, however, is the big outstanding success and good-will factor. The press will make you dominant in your territory. You will gain and hold a big truck-owner following. With the W-S-M Tire Mounting Service at their command, truck owners will stick to you in other lines, and they are heavy buyers.

We can make immediate delivery of presses. Send for details.

The Wellman-Seaver-Morgan Co.
Akron Ohio

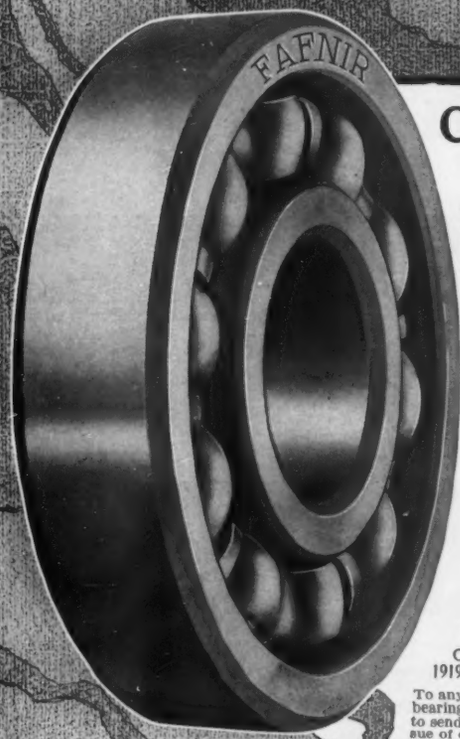
REPUBLIC *Sterling*





Mounting Tire—End of Stroke

FAFNIR



CONSERVATION and BALL BEARINGS

The conclusion of four years of war must inevitably be followed by a period of intense reconstruction. Consequently, the elimination of unnecessary bearing friction and the utmost conservation of power are more imperative at this time than ever before.

This situation makes the extensive use of ball bearings in all types of mechanisms, from motor cars and tractors to machine tools and line shafting, even more essential than in the past.

THE FAFNIR BEARING CO.
Conrad Patent Licensee
New Britain, Conn.
DETROIT Office:
752 David Whitney Bldg.
CHICAGO Office:
1919 So. Michigan Ave.

To anyone interested in ball bearings, we will be glad to send a copy of each issue of our monthly publication "*The Dragon.*"

Advertisers' Index

A

A. B. & B. Specialty Co..... 155
Aborn Steel Co., Inc..... 296
Acme Motor Truck Co..... 245
Acme Universal Joint Mfg. Co..... 277
Ahlberg Bearing Co..... 265
American Bosch Magneto Corp..... 243
American Bronze Corp..... 248
American Commercial Car Co..... 275
American Taximeter Co.....265, 301
Ames, F. A., Co., Inc..... 291
Anderson Forge & Machine Co..... 256
Arcadia Trailer Corp..... 207
Archer Iron Works..... 307
Armleder, O., Co.....131, 132
Arrow Grip Mfg. Co., Inc..... 178
Arvac Mfg. Co..... 270
Atterbury Motor Car Co..... 91
Atwater Kent Mfg. Works..... 182
Autocar Co..... 6
Automobile Devices Co..... 286
Automotive Products Corp..... 234
Automotive Wood Wheel Mfg. Association..... 175
Available Truck Co..... 143

B

Babcock, H. H., Co..... 223
Baker Gun & Forging Co..... 279
Baldwin Chain & Mfg. Co..... 128
Bantam Ball Bearing Co..... 292
Bay City Foundry & Machine Co... 282
Bearings Co. of America..... 288
Bearings Service Co..... 294
Bergie National Spark Plug Co..... 289
Bessemer Motor Truck Co..... 246
Bethlehem Motors Corp..... 195
Blood Brothers Machine Co..... 304
Borg & Beck Co..... 296
Bossert Corp..... 152
Bound Brook Oil-Less Bearing Co... 297
Bowen Products Corp..... 266
Bower Roller Bearing Co..... 191
Bowser, S. F., & Co., Inc..... 269
Brown-Lipe Chapin Co..... 134
Brunswick-Balke-Collender Co..... 180
Buda Co..... 109
Buell Mfg. Co..... 289
Buffalo Metal Products Mfg. Co.... 291
Bunting Brass & Bronze Co..... 241

C

C. A. S. Engineering Co..... 213
Capitol Motors Corp..... 284
Challoner Co..... 161
Champion Machine & Forge Co..... 297
Chicago Pneumatic Tool Co..... 232
Chicago Standard Axle Co..... 285
Childs, O. J., Co.....170, 171
Clark Equipment Co..... 93
Clark, J. L., Mfg. Co..... 271
Cleveland Worm Gear Co..... 237
Clydesdale Motor Trucks..... 197
Columbia Axle Co..... 138
Columbia Motor Truck & Trailer Co., 262
Columbian Steel Tank Co..... 174
Commerce Motor Car Co..... 268
Commercial Car Unit Co..... 295
Continental Guaranty Corp..... 99
Continental Motors Corp..... 220
Corbitt Motor Truck Co..... 307
Cotta Transmission Co..... 239
Covert Gear Co., Inc..... 199
Cramp, Wm. & Sons, S. & E. Bldg. Co..... 287
Crew Levick Co..... 206
Cullman Wheel Co..... 306

D

Dallas Brass & Copper Co..... 274
Dart Truck & Tractor Corp..... 123
Day-Elder Motors Corp..... 235
Dayton Steel Foundry Co..... 183
Delaware Hard Fibre Co..... 302
Denby Motor Truck Co..... 4
Detlaff, A. J., Co..... 210
Detroit Gear & Machine Co..... 300
Detroit Trailer Co., Inc..... 214
Dexter, I. H., Co., Inc..... 285
Diamond T Motor Car Co..... 304
Dietz, R. E., Co..... 230
Doehler Die-Casting Co..... 290
Duplex Engine-Governor Co., Inc... 273
Duplex Truck Co..... 129
DuPont Fabrikoid Co..... 281
Durston Gear Corp..... 284

E

East Iron & Machine Co..... 287
Eclipse Mfg. Co..... 294
Eisemann Magneto Co..... 127
Electric Steel Co., of Indiana..... 299
Electric Storage Battery Co..... 293
Ericsson Mfg. Co..... 145
Everitt, B. F..... 114

F

Fafnir Bearing Co..... 314
Fair, F. & Son., Inc..... 305
Fedders Mfg. Co., Inc..... 316
Federal Bearings Co., Inc..... 292
Federal Motor Truck Co..... 139
Field Mfg. Co..... 296
Findeisen & Kropf Mfg. Co..... 297
Firestone Tire & Rubber Co..... 85
Fisk Rubber Co..... 95
Fitzgerald Mfg. Co..... 272
Four Wheel Drive Auto Co..... 126
Fruehauf Trailer Co..... 164
Fuller & Sons Mfg. Co..... 200
Fulton Motor Truck Co..... 303

G

G. & O. Mfg. Co..... 233
Garford Motor Truck Co..... 211
Gates Rubber Co..... 208
General Asbestos & Rubber Co..... 168
General Motors Truck Co..... 201
General Tire & Rubber Co..... 303
Geuder, Paeschke & Frey Co..... 242
Gilbert & Barker Mfg. Co..... 222
Gill Mfg. Co..... 292
Golden, Belknap & Swartz Co..... 310
Goodrich, B. F., Rubber Co..... 318
Goodyear Tire & Rubber Co....124, 125
Graham Brothers..... 292
Gramm-Bernstein Motor Truck Co.. 212
Grant Motor Car Corp., 246a, 246b, 246c, 246d
Gray & Davis, Inc..... 247
Gray Motor Co..... 295
Guide Motor Lamp Mfg. Co..... 311

H

Harley Co..... 305
Hartford Auto Parts Co..... 278
Harvey Spring & Forging Co..... 135
Hawkeye Truck Co..... 229
Hebb Motors Co..... 181
Herschell-Spillman Motor Co...252, 253
Hess-Bright Mfg. Co..... 111
Hesse, Wm. G. & Son, Mfg. Co..... 260
Hide, Leather & Belting Co..... 300
Higgins Spring & Axle Co..... 225
Highland Body Mfg. Co..... 266
Hinkley Motors Corp..... 203
Hoosier Auto Parts Co..... 290
Hoover Steel Ball Co..... 103
Horizontal Hydraulic Hoist Co..... 302
Hyatt Roller Bearing Co..... 144
Hydraulic Hoist Mfg. Co..... 262

I

Independent Motor Truck Co., Inc.. 283
Indian Tire & Rubber Co..... 307
Indiana Silo Co..... 264
International Harvester Co. of America, Inc..... 190
International Motor Co..... 198
Iron City Spring Co..... 286

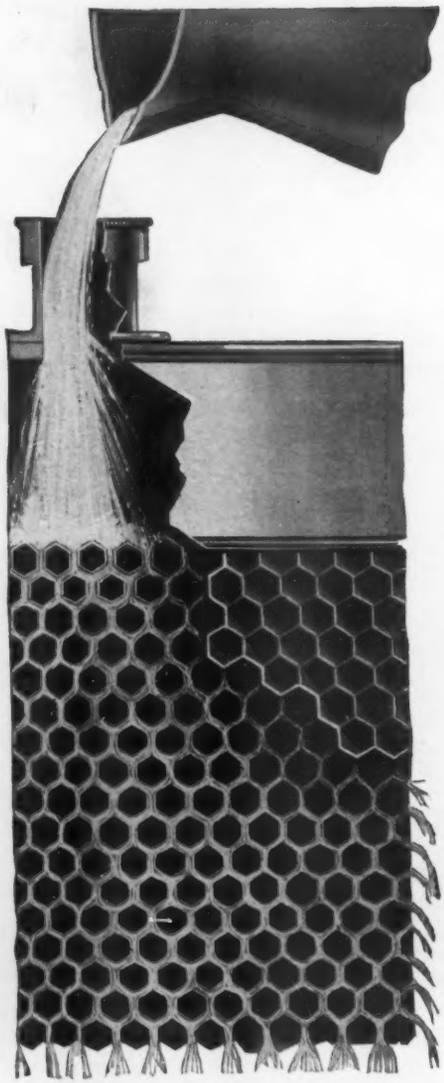
J

Janney, Steinmetz & Co..... 295
Jaxon Steel Products Co..... 146
Jenkins Vulcan Spring Co..... 295
Jewett Truck Attachment Co..... 285
Johns-Manville, H. W., Co.....258, 259

K

K-W Ignition Co..... 263
Kellogg Mfg. Co..... 163
Kelly-Springfield Motor Truck Co... 305
Kelly-Springfield Tire Co..... 221
Kilbourne & Jacobs Mfg. Co..... 306

Supreme in Cooling Efficiency



Direct Cooling. One of several exclusive Fedders features—ask about the others

Direct Cooling

THE core of the Fedders Genuine Honeycomb Radiator is composed of Individual Cellular Tubes placed in a horizontal position and joined at their expanded ends to form circulating water spaces on *all* sides of *each* tube, completely surrounding the air space.

There are no dead spaces, no projecting fins, nor any other indirect cooling surfaces. Practically every bit of metal is in *direct contact* with water on one side and air on the other. The Fedders Genuine Honeycomb has 100% Cooling Efficiency.

The above are some of the reasons why the U. S. Government standardized this type for airplanes—the service that demands most from radiators.

Do not confuse this genuine *Tube* radiator with any of the various ribbon types made of sheets rolled and joined together *to resemble tubes.*

We are again able to offer this Radiator for civil use—and at a price in keeping with the more scientific and economical methods of manufacture we have recently developed.

FEDDERS MAN'F'G CO., INC., BUFFALO, N. Y.

FEDDERS

GENUINE HONEYCOMB RADIATORS

Advertisers' Index—Continued

King Trailer Co.....115 to 122
Kissel Motor Car Co..... 205
Koehler, H. J., Motors Corp..... 298
Kokomo Wrench Co..... 290
Kramm Foundry Co..... 301

L

Laminated Shim Co..... 244
Lapeer Truck Co..... 251
Larrabee-Deyo Motor Truck Co., Inc..... 291
Lauraine Magneto Co., Inc..... 300
Lee Loader & Body Co..... 308
Le Roi Co..... 286
Lewis-Hall Iron Works.....149, 150
Light Mfg. & Foundry Co..... 303
Littleford Bros..... 288
Long Mfg. Co..... 275
Lycoming Foundry & Machine Co... 272

M

M. & S. Corp..... 298
McCord Mfg. Co., Inc..... 204
McQuay-Norris Mfg. Co..... 179
Maccar Truck Co..... 173
Martin Truck & Body Corporation. 306
Mason Tire & Rubber Co..... 240
Master Trucks, Inc..... 105
Mather Spring Co..... 140
Matthews Engineering Co..... 260
Maxwell Motor Co., Inc..... 202
Mead-Morrison Mfg. Co..... 157
Menominee Motor Truck Co..... 257
Merchant & Evans Co..... 283
Metropolitan Body Co..... 172
Michigan Lubricator Co..... 184
Michigan Steel Castings Co..... 142
Modern Electric & Machine Co..... 299
Moltrup Steel Products Co..... 290
Monarch Governor Co..... 176
Mossberg, Frank, Co..... 287
Motors Metal Mfg. Co..... 276
"Motor Trucks" 285
Muskegon Engine Co..... 294

N

Nash Motors Co..... 160
Nelson Motor Truck Co..... 238
New Departure Mfg. Co..... 270
New Process Gear Corp..... 186
Noble Motor Truck Co..... 309
Norma Co. of America..... 263
North American Motor Co..... 284

O

Oakes Co..... 159
Oakley Chemical Co..... 280
Obenberger, John, Forge Co..... 228
Ohio Trailer Co..... 209
Oneida Motor Truck Co..... 287
Oshkosh Motor Truck Mfg. Co..218, 219
Owensboro Forging Co., Inc..... 289
Owen Tire & Rubber Co..... 224

P

Packard Electric Co..... 277
Paige-Detroit Motor Car Co..... 308
Panhard Motors Co..... 298
Pantasote Co..... 147
Parish & Bingham Co..... 261
Park Drop Forge Co..... 267
Parker Appliance Co., Inc..... 303
Parry Mfg. Co..... 177
Petry, N. A., Co. Inc..... 288
Pierce-Arrow Motor Car Co..... 187
Pierce Governor Co..... 137
Piston Ring Co..... 151
Polack Tyre & Rubber Co..... 101
Portland Cement Association..... 148
Powell Muffler & Timer Co..... 288
Precision Castings Co., Inc..... 274
Pressure Proof Piston Ring Co..... 300

Q

Quaker City Supply Co., Inc..... 194

R

Radium Dial Co..... 267
Rainier Motor Corp..... 293
Recording Devices Co..... 304
Redden Motor Truck Co..... 296
Reo Motor Car Co..... 158
Republic Motor Truck Co., Inc. Front Cover
Rogers Brothers Co..... 305
Rome-Turney Radiator Co..... 264
Ross Gear & Tool Co..... 87
Rowe Calk & Chain Co..... 280
Rowe Motor Mfg. Co..... 162
Russel Motor Axle Co. Inside Back Cover

S

Sampstone Mfg. Co..... 261
Sanford Motor Truck Co..... 297
Savage Arms Corp..... 302
Schacht, G. A., Motor Truck Co.... 298
Schwartz Motor Truck Co..... 249
Schwarz Wheel Co..... 304
Selden Truck Sales Co..... 231
Service Motor Truck Co 167
Sewell Cushion Wheel Co..... 97
Sheldon Axle & Spring Co..... 196
Signal Motor Truck Co..... 136
Silvex Co..... 216
Simplex Mfg. Co..... 153
Sivyer Steel Casting Co..... 89
Smith Wheel, Inc..... 113
Spicer Mfg. Corp..... 156
Standard Foundry Co..... 281
Standard Motor Truck Co..... 255
Standard Parts Co..... 166
Standard Roller Bearing Co..... 192
Standley Skid Chain Co..... 254
Stewart Motor Corp.....Back Cover
Stromberg Motor Devices Co..... 215
Sullivan Motor Truck Corp..... 301
Sunderman Corp.....226, 227

T

Teagle Co..... 294
Thermoid Rubber Co.....165, 236
Timken-Detroit Axle Co..... 185
Timken Roller Bearing Co..... 154
Titan Truck Co..... 289
Torbensen Axle Co..... 189
Tower Motor Truck Co..... 286
Traffic Motor Truck Corp..... 169
Trageser, John, Steam Copper Works 301
Trailmobile Co..... 279
Triangle Motor Truck Co..... 278
Tuthill Spring Co..... 284

U

Union Switch & Signal Co..... 299
United States Motor Truck Co..... 141
United States Tire Co..... 107
Universal Machine Co..... 269

V

Veeder Mfg. Co..... 268
Victor Truck Co..... 309

W

Walker Mfg. Co..... 217
Ward LaFrance Truck Co., Inc..... 299
Warner Gear Co..... 271
Warner Mfg. Co..... 282
Watson Wagon Co..... 130
Waukesha Motor Co..... 293
Wellman-Seaver-Morgan Co....312, 313
Westinghouse Electric & Mfg. Co... 133
West Steel Casting Co. Inside Front Cover
White Co..... 193
Williams, J. H., & Co..... 273
Wilson, J. C., Co..... 306
Winther Motor Truck Co..... 188
Wood Hydraulic Hoist & Body Co.. 250
Woonsocket Wagon Mfg. Co..... 291
Wright Roller Bearing Co..... 293
Wyman-Gordon Co..... 5

Y

York Corrugating Co..... 276

Do You Feel This Way After One Year?

RICKS MOTOR COMPANY
Uniontown, Pa.
January 15/19

Mr. A. M. Jack,
B. F. Goodrich Rubber Co.,
Pittsburgh, Pa.

My dear Mr. Jack:

I have never as yet known a one-sided deal to be mutually satisfactory. The other fellow must also have an even break or else eventually, he will gather up his toys and quit playing.

We have much to be thankful for these days, and among the many things is the realization that for the past year we have been connected with a corporation that exemplifies the Golden Rule.

Therefore, on behalf of the Ricks Motor Company, I desire to extend to each and every member of the B. F. Goodrich organization, our thanks for the splendid manner in which you have stood behind us and to further assure you that we are sold on your methods of doing business.

Now Boy, over the top for the next trench.

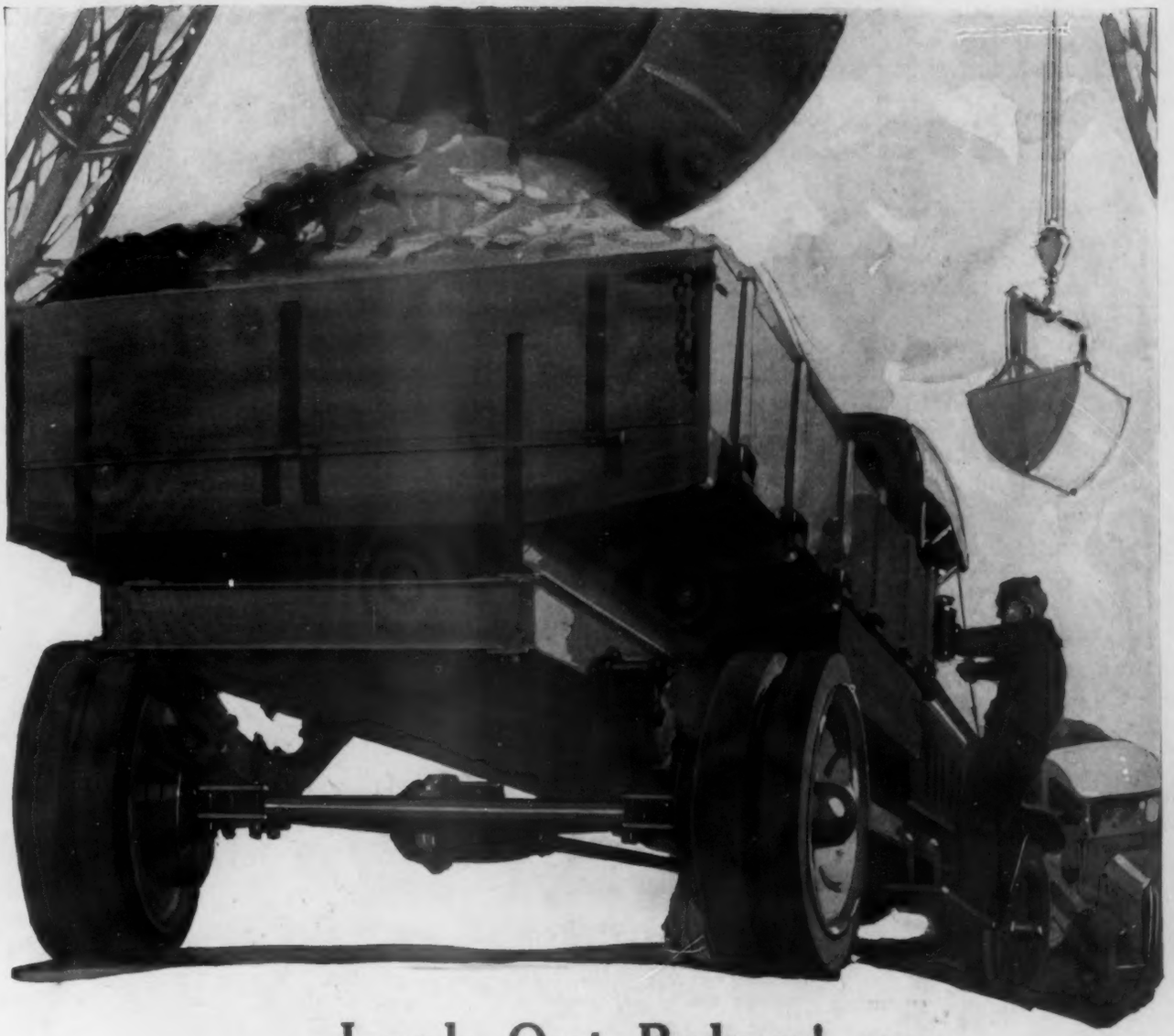
RICKS MOTOR COMPANY

(Sgd) R. C. Ricks.

Goodrich Truck Tire Demand makes necessary the immediate addition of several new distributors in prosperous territories. If you can qualify—here's your chance! Write the Truck Tire Department.

THE B. F. GOODRICH RUBBER COMPANY
The City of Goodrich—AKRON, OHIO

GOODRICH
DeLuxe Truck Tires



Look Out Below!

The clam-shell opens. Down drops the avalanche of wet clay—a ton or two tons of it.

And what part of the Truck must bear that sudden, tremendous blow?

It is the Axle.

The Contractor knows that. He also knows that the only Axle that is certain to withstand that sudden, tremendous blow of a ton or two tons of wet clay is the Axle with the Dead Axle, the Load-Carrying Shock-Standing Axle designed for that single specific purpose.

The Contractor knows that this is one of the great outstanding features and advantages of the Russel Internal-Gear Drive Axle.

The Contractor knows another requisite of the successful Truck in Excavating Work. He knows that after he loads his Truck with two tons or three tons of wet clay the Truck must have Enough Power and Traction to crawl out of the Excavation.

That is another outstanding advantage of the Russel Internal-Gear Drive Axle. Then the Live Axle, the Power Axle, takes up the work and finishes the job. There is Surplus Power in the Russel because that Power is applied near the Rims of the Wheels. And there is more than enough road clearance for the roughest and toughest hauling.

Russel Motor Axle Company, Detroit, U. S. A.

Russel Drive

Master of Road and Load

Full Stewart Power Used for Driving

The Stewart method of applying power delivers more than 90 per cent to the rear wheels. It makes the springs, instead of the tires, absorb starting, stopping and road shocks. This lengthens the life of tires and truck. It reduces gasoline consumption.

Power is utilized as fully at three miles an hour as at full speed. It gives full power value even at the start, whether on the level or on a steep grade. These features are uncommon in motor trucks.

Let a Stewart dealer explain why this is true. He will be glad to show the construction that eliminates loss of power in the Stewart.

Stewart price is $200 to $300 below the average for trucks of equal capacity.

Stewarts have 600 to 700 fewer parts. Adjustments that invite tinkering and tampering have been eliminated.

Lubrication is practically automatic. There are fewer grease cups and places to oil. Stewarts are designed to be fool-proof.

Thousands of Stewarts are used throughout the United States and in 24 foreign countries. They are giving daily service in more than 200 different lines of business. Some are operated in fleets of 5 to 50.

STEWART MOTOR CORPORATION
Buffalo, New York

¾ Ton Chassis	-	$ 950.00
1 Ton Chassis	-	1575.00
1½ Ton Chassis	-	1975.00
2 Ton Chassis	-	2575.00
3½ Ton Chassis	-	3500.00

(f.o.b. Buffalo)

(8-00)

QUALITY TRUCKS Stewart QUANTITY PRICES

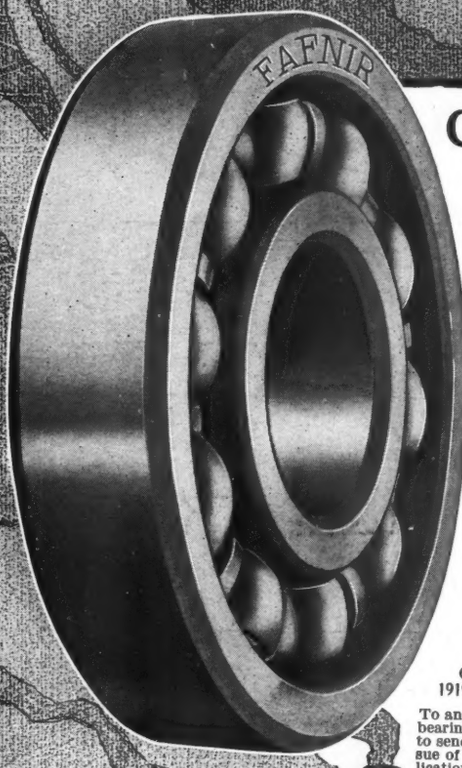
Cost less to buy
(Compare the value)

Cost less to run
(Ask Stewart Owners)

Give longer service
(In five years no Stewart has worn out)

Stewart
MOTOR TRUCKS

FAFNIR



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Advertisers' Index

A

A. B. & B. Specialty Co..... 155
Aborn Steel Co., Inc..... 296
Acme Motor Truck Co..... 245
Acme Universal Joint Mfg. Co..... 277
Ahlberg Bearing Co..... 265
American Bosch Magneto Corp..... 243
American Bronze Corp..... 248
American Commercial Car Co..... 275
American Taximeter Co.....265, 301
Ames, F. A., Co., Inc..... 291
Anderson Forge & Machine Co..... 256
Arcadia Trailer Corp..... 207
Archer Iron Works..... 307
Armleder, O., Co.....131, 132
Arrow Grip Mfg. Co., Inc..... 178
Arvac Mfg. Co..... 270
Atterbury Motor Car Co..... 91
Atwater Kent Mfg. Works..... 182
Autocar Co..... 6
Automobile Devices Co..... 286
Automotive Products Corp..... 234
Automotive Wood Wheel Mfg. Association..... 175
Available Truck Co..... 143

B

Babcock, H. H., Co..... 223
Baker Gun & Forging Co..... 279
Baldwin Chain & Mfg. Co..... 128
Bantam Ball Bearing Co..... 292
Bay City Foundry & Machine Co... 282
Bearings Co. of America..... 288
Bearings Service Co..... 294
Bergie National Spark Plug Co..... 289
Bessemer Motor Truck Co..... 246
Bethlehem Motors Corp..... 195
Blood Brothers Machine Co..... 304
Borg & Beck Co..... 296
Bossert Corp..... 152
Bound Brook Oil-Less Bearing Co... 297
Bowen Products Corp..... 266
Bower Roller Bearing Co..... 191
Bowser, S. F., & Co., Inc..... 269
Brown-Lipe Chapin Co..... 134
Brunswick-Balke-Collender Co..... 180
Buda Co..... 109
Buell Mfg. Co..... 289
Buffalo Metal Products Mfg. Co.... 291
Bunting Brass & Bronze Co..... 241

C

C. A. S. Engineering Co..... 213
Capitol Motors Corp..... 284
Challoner Co..... 161
Champion Machine & Forge Co..... 297
Chicago Pneumatic Tool Co..... 232
Chicago Standard Axle Co..... 285
Childs, O. J., Co.....170, 171
Clark Equipment Co..... 93
Clark, J. L., Mfg. Co..... 271
Cleveland Worm Gear Co..... 237
Clydesdale Motor Trucks..... 197
Columbia Axle Co..... 138
Columbia Motor Truck & Trailer Co., 262
Columbian Steel Tank Co..... 174
Commerce Motor Car Co..... 268
Commercial Car Unit Co..... 295
Continental Guaranty Corp..... 99
Continental Motors Corp..... 220
Corbitt Motor Truck Co..... 307
Cotta Transmission Co..... 239
Covert Gear Co., Inc..... 199
Cramp, Wm. & Sons, S. & E. Bldg. Co..... 287
Crew Levick Co..... 206
Cullman Wheel Co..... 306

D

Dallas Brass & Copper Co..... 274
Dart Truck & Tractor Corp..... 123
Day-Elder Motors Corp..... 235
Dayton Steel Foundry Co..... 183
Delaware Hard Fibre Co..... 302
Denby Motor Truck Co..... 4
Detlaff, A. J., Co..... 210
Detroit Gear & Machine Co..... 300
Detroit Trailer Co., Inc..... 214
Dexter, I. H., Co., Inc..... 285
Diamond T Motor Car Co..... 304
Dietz, R. E., Co..... 230
Doehler Die-Casting Co..... 290
Duplex Engine-Governor Co., Inc... 273
Duplex Truck Co..... 129
DuPont Fabrikoid Co..... 281
Durston Gear Corp..... 284

E

East Iron & Machine Co..... 287
Eclipse Mfg. Co..... 294
Eisemann Magneto Co..... 127
Electric Steel Co., of Indiana..... 299
Electric Storage Battery Co..... 293
Ericsson Mfg. Co..... 145
Everitt, B. F..... 114

F

Fafnir Bearing Co..... 314
Fair, F. & Son., Inc..... 305
Fedders Mfg. Co., Inc..... 316
Federal Bearings Co., Inc..... 292
Federal Motor Truck Co..... 139
Field Mfg. Co..... 296
Findeisen & Kropf Mfg. Co..... 297
Firestone Tire & Rubber Co..... 85
Fisk Rubber Co..... 95
Fitzgerald Mfg. Co..... 272
Four Wheel Drive Auto Co..... 126
Fruehauf Trailer Co..... 164
Fuller & Sons Mfg. Co..... 200
Fulton Motor Truck Co..... 303

G

G. & O. Mfg. Co..... 233
Garford Motor Truck Co..... 211
Gates Rubber Co..... 208
General Asbestos & Rubber Co..... 168
General Motors Truck Co..... 201
General Tire & Rubber Co..... 303
Geuder, Paeschke & Frey Co..... 242
Gilbert & Barker Mfg. Co..... 222
Gill Mfg. Co..... 292
Golden, Belknap & Swartz Co..... 310
Goodrich, B. F., Rubber Co..... 318
Goodyear Tire & Rubber Co....124, 125
Graham Brothers..... 292
Gramm-Bernstein Motor Truck Co.. 212
Grant Motor Car Corp., 246a, 246b, 246c, 246d
Gray & Davis, Inc..... 247
Gray Motor Co..... 295
Guide Motor Lamp Mfg. Co..... 311

H

Harley Co..... 305
Hartford Auto Parts Co..... 278
Harvey Spring & Forging Co..... 135
Hawkeye Truck Co..... 229
Hebb Motors Co..... 181
Herschell-Spillman Motor Co...252, 253
Hess-Bright Mfg. Co..... 111
Hesse, Wm. G. & Son, Mfg. Co..... 260
Hide, Leather & Belting Co..... 300
Higgins Spring & Axle Co..... 225
Highland Body Mfg. Co..... 266
Hinkley Motors Corp..... 203
Hoosier Auto Parts Co..... 290
Hoover Steel Ball Co..... 103
Horizontal Hydraulic Hoist Co..... 302
Hyatt Roller Bearing Co..... 144
Hydraulic Hoist Mfg. Co..... 262

I

Independent Motor Truck Co., Inc.. 283
Indian Tire & Rubber Co..... 307
Indiana Silo Co..... 264
International Harvester Co. of America, Inc..... 190
International Motor Co..... 198
Iron City Spring Co..... 286

J

Janney, Steinmetz & Co..... 295
Jaxon Steel Products Co..... 146
Jenkins Vulcan Spring Co..... 295
Jewett Truck Attachment Co..... 285
Johns-Manville, H. W., Co.....258, 259

K

K-W Ignition Co..... 263
Kellogg Mfg. Co..... 163
Kelly-Springfield Motor Truck Co... 305
Kelly-Springfield Tire Co..... 221
Kilbourne & Jacobs Mfg. Co..... 306

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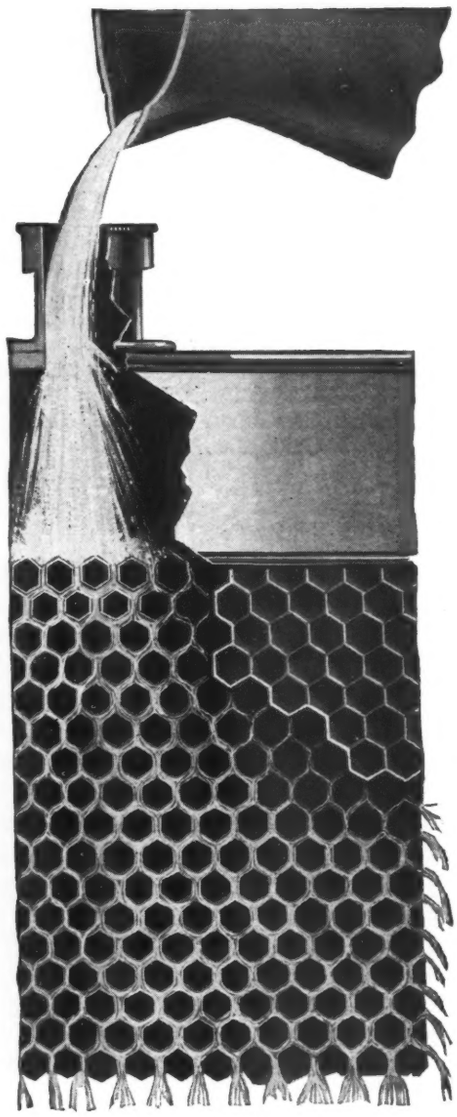

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THE COMMERCIAL CAR JOURNAL

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TABLE OF CONTENTS

	Page
Advertisers' Index	295
Commercial Car Specifications	35
Editorials	21
Efficient Repair Methods	64
Equipment and Appliances	51
Factory News	33
M. T. A. Activities of Philadelphia	29
New Agencies	33
New Commercial Cars	43
News of the Trade	22
Personal Items	31
Removals and Trade Changes	33
Steel and Rubber Markets	78

SPECIAL ARTICLES

Hutchinson, Kansas, Enjoys Motorized Transfer Service	7
Secretary Houston Sees Biggest Year for Road Building	9
Details of the New Revenue Tax	11
Boston Truck Dealers Run Street Exhibits	14
Motor Truck Sales Managers' Convention in Philadelphia	15
Standard Traffic Rules Adopted	26
Insurance Discussed by Motor Truck Club of New Jersey	30
Big Packing and Provision Business Saved by Motor Trucks	60
Washington Community Market Helps to Reduce the H. C. L.	63
A New Steel Mill of Unusual Construction	67
One and a Half Million Pounds a Month on Pneumatics	70
Meetings Between Employer and Employee Result in More Prosperous Business	74
Pneumatic-Tired Trucks in Many Lines of Business	80
Selling a Seemingly Hard Prospect	84
Co-operative Delivery Plan Has Its Disadvantages	88
A State's Most Valuable Asset	90
Co-operative Truck Line in Short Haul Field	96

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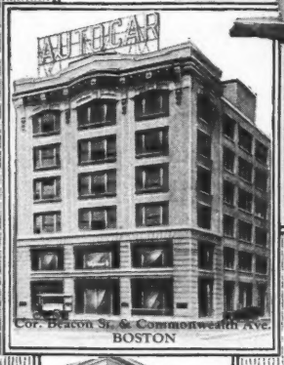

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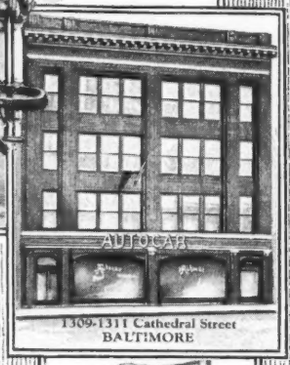

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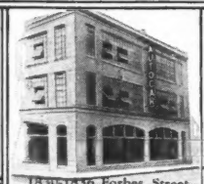
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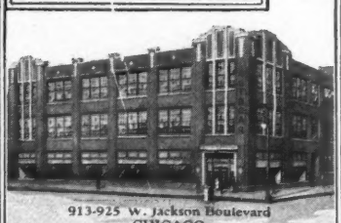
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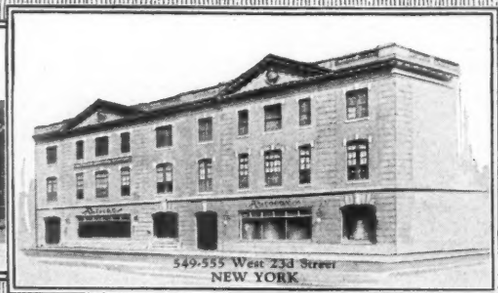
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